THE

# JOURNAL OF GAS LIGHTING,

## WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. VIII. No. 171.—11th YEAR.] LONDON, MAY 10, 1859. [Subscription per Ann. 15s. in Advance, 18s Credit.] Price 8d. Unstamped.

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**FIRE-CLAY Retorts and Fire Goods.** The Advertiser has brought his Fire-Clay Retorts to great perfection, both as to quality and finish. Many have stood three and four years.

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**TO be Sold, a Station-Meter, in round** Cast-Iron Case, capable of passing 50,000 cubic feet of Gas in 24 hours, now at work at the Gas-Works, SHIPLEY. Price £25.

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W. R. HALL JORDAN,
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Dated, Teignmouth, Devon, April 30, 1859.

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Applications, with Testimonials, to be addressed to the Chairman of the Gas Committee, Town Hall, SOUTHPORT, and sent in on or before the 26th inst.

By order,
T. B. HODGKINSON,
Clerk to the Committee.

Town Hall, Southport, May 7, 1859.

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**THE Advertiser, who is practically** acquainted with the Manufacture and Distribution of Gas, Retort Setting, Main and Service Laying, Fitting, Rectifying of Meters, and the whole routine of a country establishment, is open to an Engagement as MANAGER of Gas-Works. Is also qualified as Secretary or Collector. Security can be produced, likewise references and testimonials of character and ability as Gas Manager.

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To be seen on application to the STOREKEEPER, at the Equitable Gas Company's Works, Lupus Street, PIMLICO.

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Portadown, April 4, 1859.

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Station and Experimental Meters, Gas Pressure Registers, Gauges, Experimental Gasholders, Governors, Slide Valves, &c. &c.

W. and G. would respectfully call the attention of Gas Engineers and Managers to their Station-meters, having made and erected the largest in use at the present time, two of which may be seen at the Stockport and Liverpool Gas Works, on application to the respective Engineers.

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**ON SALE, Two Station-Meters, in** Round Cast-Iron Cases, made by Parkinson and Co. in 1847, to pass 10,000 cubic feet of Gas per Hour, and now at work at the Gas-Works, Leicester. Price £40 each net.

Further particulars may be obtained on applying to H. M. ROBINSON, Esq., Gas Office, LEICESTER; or to WEST and GREGSON, OLDHAM.

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**WM. RICHARDSON and CO.,**
SPRING GARDEN IRON-WORKS,
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Manufacturers of Gas Apparatus in all its branches. A large assortment of New and Second-hand Gas Apparatus constantly for Sale.

Gas Apparatus Enlarged and Exchanged.

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W. C. begs respectfully to call the attention of Gas Companies to his PATENT GAS-GOVERNOR for STREET LAMPS, upwards of 3000 of which are now in use on Public Lamps. By their use any given quantity of Gas per hour may be consumed with the tap full open whatever the increase of pressure may be, thus preventing a great waste of Gas in many of the Lamps, and securing to the public an uniform light. Prices, 3s. 4d., 3s. 6d., and 3s. 8d. each.

Governors kept in stock from three-eighths of an inch to four inches bore.

Samples and Testimonials forwarded on application to WILLIAM CLIBRAN, 43, Todd Street, MANCHESTER.

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ENGINEERS & METER-MAKERS,
CRAWFORD PASSAGE, RAY STREET,
CLERKENWELL, LONDON (E. C.).

Manufacturers of Station and Patent Protector Consumers' Meters, Patent Slide-Valves, Gas-Fittings, Pipes, &c.

Also, High-pressure Cocks, Hydrants, Closets, and all Water-Fittings.

**BRYAN DONKIN and CO.'s improved** GAS VALVES have been adopted by numerous Gas Companies in England and abroad, and their advantages and great security fully proved. Very large numbers are in use. Prices from 11s. 6d. to 13s. 6d. per inch diameter.

BRYAN DONKIN and Co.,
Engineers, near Grange Road, BERMONDSEY.

JOURNAL OF GAS LIGHTING NEWSPAPER

# THOMAS GLOVER,

## PATENT DRY GAS-METER MANUFACTURER,

SUFFOLK STREET, CLERKENWELL GREEN, AND
ALLEN STREET, GOSWELL STREET, E.C.

*LONDON, March* 25, 1859.

THOMAS GLOVER takes this opportunity of thanking Gas Companies and his other Customers for the very liberal support and patronage he has received during the past year, which has far exceeded his most sanguine anticipations, having sold a greater number of his PATENT DRY GAS-METERS since the dissolution of his partnership with Mr. Croll than he was ever previously enabled to do in any one year.

THOMAS GLOVER confines his sole attention to the business of Gas-Meter Making. The propriety of his doing so is satisfactorily proved by his success; and, without the practice of any quackery, or any attempt to delude the public by an absurd exhibition of "Old and New Valves," his Meters are in general use by the Metropolitan Gas and other Companies in this Country and abroad. For example, one Metropolitan Company have now in use above **12,500** of his Patent Dry Gas-Meters; some of these Meters have been fixed for Fourteen Years, and are still in working order, without complaint from either the Company or the Consumer.

THOMAS GLOVER thinks it necessary to put Gas Companies on their guard against parties selling Patent Dry Gas-Meters constructed in imitation of his, but unskilfully made on erroneous principles, and with improper and unsuitable materials.

THOMAS GLOVER'S Workshops are now the most extensive in this or any other Country, and he is thereby enabled promptly to execute orders to any extent required. Purchasers may at any time inspect his Works and the Materials of which his Meters are constructed. He is ready to enter into Contracts with Gas Companies and others to uphold their Stock of his Meters for Twenty Years at an annual charge varying from 2½ to 5 per cent., and to leave always in the hands of Gas Companies Three Years' charge for upholding, as a guarantee for the fulfilment of the Contract.

CROSLEY & GOLDSMITH'S

## PATENT SELF-ADJUSTING & COMPENSATING GAS-METERS

### CANNOT BE OVER OR UNDERCHARGED WITH WATER,

and they consequently register the quantity of Gas consumed with greater accuracy than Meters in which the Water-Line is variable.

MANUFACTURED BY

## CROSLEY & CO.,

GAS-METER MANUFACTURERS,

## 103, SOUTHWARK BRIDGE ROAD, LONDON.

N.B. The Patent Self-Adjusting and Compensating Apparatus may be applied to the ordinary Meter.

Manufacturers of LOWE'S PATENT MOTIVE-POWER METER, for situations where there is an inadequacy of pressure to supply the special requirements of certain consumers in low grounds during the day or night.

Also, Manufacturers of EXPERIMENT METERS, GASHOLDERS, GOVERNORS, MINUTE-CLOCKS, PHOTOMETERS, &c. &c., similar to those used by Mr. King, of Liverpool.

EXTRACT FROM THE REPORT OF MESSRS. LOWE, KIRKHAM, PEARSE, AND BARLOW, ON CROSLEY AND GOLDSMITH'S PATENT METERS.

Our experiments lead us to the conclusion that the patent meter is a practical and substantial improvement upon the ordinary wet gas-meter, inasmuch as the capacity of the measuring-chamber is not diminished by an excessive supply of water, nor can it be increased by drawing off water. On the one hand, therefore, the consumer is protected against any intentional or negligent overfilling of the meter, the result of which is to exaggerate the registered quantity of gas actually consumed; and, on the other hand, the gas manufacturer is protected against the fraudulent abstraction of water by the consumer, the effect of which in the ordinary meter is to cause it to register less gas than is really supplied. Time alone can determine whether these advantages are gained at the expense of its durability, or by any complexity which may render its utility doubtful; but, so far as we are able to form an opinion upon these points, the patent meters are not liable to any greater derangement than the ordinary wet meters, nor do we believe they will be less durable. (Signed) GEORGE LOWE, *C.E., F.R.S., Engineer-in-Chief to the Chartered Gas Company.*
JOHN KIRKHAM, *C.E., late Engineer-in-Chief of the Imperial Gaslight Company.*
GEDDIE PEARSE, *late Engineer-in-Chief to the Incorporated and Provincial British Gaslight Companies.*
THOMAS G. BARLOW, *Civil and Consulting Gas Engineer.*

**LICENCES GRANTED TO THE TRADE ON MODERATE TERMS.**

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## TO CORRESPONDENTS.

J. L., Strabane.—*Two hundred and fifty lights of 4 feet per hour.*

## NOTICES.

The subscription is 15s. per annum, if paid in advance during the month of January, or 18s. credit, in two sums of 9s. each, in July and January of each year. Post-Office orders must be made payable at the Charing-Cross Money-Order Office, to William H. Bennett, No. 42, Parliament Street, Westminster.

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All Communications to be addressed to the Editor, No. 42, Parliament Street, Westminster; and orders for Advertisements to the Publisher, Mr. W. B. King, No. 11, Bolt Court, Fleet Street.


# THE JOURNAL OF GAS LIGHTING, WATER SUPPLY, & SANITARY IMPROVEMENT.

*TUESDAY, MAY 10, 1859.*


## NOTES UPON PASSING EVENTS.

THE elderly female who writes the alarmist City articles of the *Times*, has recently endeavoured to add her mite to the commercial evils produced by the very reckless manner in which that influential journal has spread the false news with respect to the diplomatic relations of the great powers; and if the nation were to allow itself to be guided by the author we refer to, we should shortly witness either the prohibition of the export of goods "contraband" of war, or their exportation would be subjected to heavy duties. It is said, however, that even the present Government has entertained a project for restricting the export of cement, pitch, tar, and coal, on the pretence that they are in fact articles of war; and as the effect of such a proceeding would materially affect the interests represented by this JOURNAL, we feel bound at once to record our protest against it.

For, without dwelling upon the ill feeling which must be engendered in the minds of both the belligerent parties by an interference of so petty and irritating a character, we would observe that, so far would the project we refer to be from effecting the desired object, that it would only inflict a heavy blow on our own commerce. As to the export of cement from this country, it only takes place at present on account of the greater cheapness at which the English manufacturers produce the article, from the fact of their possessing large capital and properly organized establishments and machinery. The margin of their profits is even now very narrow, and a slight export duty, or even a merely formal interference with this trade, would suffice to induce some one or other of our manufacturers to transfer their industry to other countries; and it is notorious that there are many places which yield the materials required for the manufacture of both the natural and the artificial cements in both France and Germany. In fact, an export duty on cement would simply result in the destruction of an important branch of our foreign trade, and create for us formidable rivals in our own markets. It is more than probable, for instance, that the artificial cements which could be made in Germany would be of a superior quality to those we could make in England, if the same amount of skill and commercial energy were employed in both cases.

Then again with respect to pitch and tar, we should, by imposing duties on their export, simply transfer the trade in those articles to more truly neutral nations. The pitch from Norway, Sweden, Russia, and America, would find its way into the open ports of the belligerent powers, even if we prevented the export of that article from our own shores; and the importance of tar as a munition of war is so ridiculously small that it seems the height of wanton mischief to throw difficulties in the way of disposing of one of the residual products of gas manufacture which at present is rather a drug on the market. In this case, again, we should be injuring ourselves, without in any way crippling the powers of either of the hostile parties; but the most mischievous of all the proposed interferences with trade would be the one whereby the export of coal would be affected, and the extent of the evil it would produce would be so great as almost to raise the question into one of national importance. Not only would the imposition of a duty upon coals sent from England entail a heavy burthen upon the English capital embarked in manufacturing and industrial operations on the Continent; but it would eventually injure the coal, mining, and shipping interests of England. There are in France, Belgium, Spain, Germany, Asia Minor, &c., many already explored coal-fields which might, by a very slight turn in the markets, enter at once into competition with our own; and an increase in the price of coal would also direct attention again to the conversion of the peats and lignites of many parts of the Continent into more valuable sources of light and height. There is nothing impossible in the notion of increasing the illuminating power of peat gas either by modifications in the manner of distillation, or by mixing some gas of a higher illuminating power. Of course this is a question of expense, but an export duty would go far to solve it, in a manner which our commerce might rue bitterly.

The importance of the peat trade of some of the continental nations is so little known in England, that it may be of interest here to add that the total consumption of that article of fuel in Holland alone was, in 1834, not less than 22,275,623 tons; in 1852 it was 33,943,630 tons; and in 1857 it was 39,217,334 tons. Evidently England has little interest in excluding itself from a market of such a description; and it must be observed that an export duty would apply equally to the export to Holland as to France or Austria. And, again, it must not be supposed that when we speak of the possible rivalry of the lignites, that we are conjuring up an imaginary danger; for there are some deposits, called lignites, in the island of Sardinia and on the Italian main, that we happen to know something about, which might be advantageously used in the manufacture of gas if the price of coal were to be much increased. In the above remarks we have also left entirely out of account the competition which might arise between the electric light and that obtained from coal gas. Artificial difficulties thrown in the way of the latter will but turn public attention to the former with greater energy.

Descending from these lofty regions of politics to the consideration of the events passing around us, it may be a legitimate subject of congratulation to the inhabitants of London that the Metropolitan Board have seriously commenced the execution of the works required for the great intercepting sewers. A series of experimental shafts have been sunk, or are in progress, for the purpose of ascertaining the nature of the soil to be traversed by the various branches of that great undertaking; and thus, it is to be hoped, that a repetition of the costly blunders of the parties entrusted with the execution of the Victoria sewer may be avoided. It is also said that Mr. Leslie is about to be made either to substantiate his accusation against the *employés* of the Metropolitan Board of Works, or to withdraw that accusation as publicly as it was made; and we ourselves cannot but approve the resolution of the parties who have determined thus to bring the matter to a distinct issue. It was not possible for the Surveyors of the Board to remain

under the imputation of having been parties to "a swindle;" and they owed it to themselves and to the Board they serve, to notice in an effectual manner a charge so publicly made. The dispute between Mr. Newlands and the *Builder*, which bade fair to assume nearly the same character as that between Mr. Leslie and the Surveyors of the Metropolitan Board, we may add, has been settled in a manner which is little to the credit of either party; but as it has been allowed by them to drop, it would be useless to revive the quarrel. "*Risu solvuntur tabulæ.*" The susceptibility of Mr. Newlands and the magnificent grandeur of the *Builder* are, indeed, equally misplaced and equally ridiculous.

At Reading, Mr. Alderman Brown seems to have fallen into a very common error, and being annoyed at the evident exaggeration and humbug of the Sanitarians, he has run into the opposite extreme, and raised an outcry against anything like sanitary improvement. This is much to be regretted; for, although unquestionably it is absurd to say that the execution of a system of town drainage is the remedy to half the ills which flesh is heir to in the shape of fevers, dysenteries, choleras, &c., it is equally notorious that the execution of such works must materially improve the sanitary condition of any place. The antipathy which many honourable, conscientious persons thus exhibit towards the execution of sanitary works is one of the natural consequences of the reaction produced by the exaggeration of the Chadwickian school. This reaction must run its course, and then perhaps opinions more consonant with common sense may prevail in the matter.

Latterly the inhabitants of Woolwich have complained, with a very natural amount of bitterness, against the utter contempt manifested by the directors of the Royal manufacturing establishments in their parish for the provisions of the Smoke Nuisance Abatement Act, which the Government and the police spies enforce with so much rigour against private parties. Why, indeed, should the factories lately erected at Woolwich for the purpose of competing, by means of the funds raised from the general body of taxpayers, with the manufacturers of England, be exempted from the ordinary obligations of the latter? If smoke be a nuisance when it proceeds from the chimney of a private Factory, it must equally be so when it proceeds from the chimneys of a national establishment. If it be said that it is not possible to effect the desired object of "consuming the smoke" in a Factory like those at Woolwich, we must naturally ask why the same impossibility should not exist in the case of private factories? and thus the legislators who have countenanced the absurd Act to which we have referred, stand convicted of either ignorance of the matter they pretended to deal with, or of a desire to throw unnecessary difficulties in the way of private enterprise.

A rather curious event is said to have lately taken place in the Church of St. Peter's of Colchester, to which it may be desirable to call the attention of those who are charged with the direction of works for the purpose of warming and ventilating public buildings. It is said that in the substructure of this church a great deal of wood had been used; and latterly, upon the completion of the warming apparatus, the damp heat which existed under the floor has developed the eggs of a peculiar small ant, and the ants, in their turn, have overrun the church. At the present day, when the question of the spontaneous generation of the lower forms of organic life is again being discussed, this story may have an incidental and extraneous interest; but it appears to us to show that the use of timber in situations where heat could be made to produce such results—even on the assumption that the whole story of the invasion of St. Peter's Church by ants be not true—should henceforth be avoided. The damp heat which would develop the germs of insect life, would unquestionably develop the germs of any fungi, or perhaps set in action the peculiar fermentation which gives rise to wet, or to dry, rot. Before establishing a system of warming beneath the floors of an old building, it therefore becomes necessary to examine whether there be much wood-work in the foundations, and to guard against the possible changes in it, should it so exist. The buildings erected about the middle of the last century would be especially exposed to danger of this deseription, for it was the fashion in those days to found upon timber platforms; and the alterations which have taken place in the conditions of moisture in the superficial strata of our country, through the development of both land and town drainage, are alone sufficient to induce fears for the stability of buildings so founded, without any additional danger from the application of artificial heat.

We hear that the water-works at Margate are being carried on with spirit by the Company which has undertaken their execution, and that very shortly that town will enjoy the inestimable advantage of a good supply of pure water from the chalk. But although the existence of some powerful springs in the bay of Margate removes any possible fear of a deficiency in the supply at this particular place, the question still rises as to what will be the ultimate effect of the pumping which is now going on in other districts of the same formation. Thus, at Dover and at Worthing, it would appear that the water-line is being gradually lowered; and the unprecedented droughts of the last two years invest the inquiry with an unusual degree of interest, especially as there appears to be upon the sea-shore a limit beyond which it is not safe to lower the land-water, if it be desired to prevent the infiltration of the sea-water. The question of the permeability of the strata near the shore has been but little studied hitherto; but as possibly the supplies of such towns as Liverpool, Birkenhead, &c., may be affected by it, we think that we are rendering a service in calling attention to a subject of such importance.

Perhaps, however, the most interesting hydraulic operations lately effected are those connected with the wells stated to have been executed in Spain, and in the Desert of Sahara. Some time since we called attention to the latter, and we suggested that it might be desirable to try analogous experiments in our own Asiatic dominions. Now that they are—not to speak it profanely—providentially pacified, our rulers may again turn to the great works of public improvement interrupted by the Rebellion; and we therefore again revert to the operations of the French for the improvement and civilization of Northern Africa, especially as the publication of a long Report, on the subject of the Artesian wells lately sunk in the heart of the desert, by General Desvaux, in the fifth number of the "*Annales des Mines*" for 1858, has brought the whole matter again before the world, in a more authentic form than had previously appeared. From this document it seems that, up to the end of the military year 1857-58, no less than fifteen Artesian borings had been commenced in the desert, and that eleven of them had been successful; whilst the other four were in progress, with a fair chance of success in the case of two out of the four. The total quantity of water thus poured upon the surface of the desert, which only required this stimulant to become a fertile garden, is said to have been not less than 4030 gallons per minute; and one of the wells alone yields about 946 gallons in that time, or above 1,400,000 gallons a day. Well, indeed, may General Desvaux boast of the result of his labours, and great, indeed, is the benefit they must confer on the populations of the interior of Africa, hitherto isolated from the civilized world by the burning Deserts. Something of the same kind has acted to render Spain what it is said, by a species of "bull," to be—viz., a portion of Africa in Europe; and therefore it is that the execution of Artesian wells in its scorched plains must be hailed as the harbinger of improvement. A well has been sunk with success upon the Madrid and Alicante Railway, which it is to be hoped will only be the first of a series of similar operations. A table of the principal results of the borings in Algeria is appended:—

| Name of Boring. | Yield Gallons per Minute. | Temperature. Fahrenheit. | Depth. Ft. | In. |
|---|---|---|---|---|
| Tamerna. . . . | 882·2 . . | 69·8 . . | 196 | 9 |
| Temacin . . . . | 7·7 . . | 69·8 . . | 277 | 9 |
| Tamel'hat . . . | 26·4 . . | 71·6 . . | 191 | 10 |
| Sidi Rached . . . | 946·0 . . | 75·2 . . | 177 | 2 |
| Oum Thiour. . . | 39·6 . . | 69·8 . . | 343 | 5 |
| Chegga . . . . | 19·8 . . | 72·5 . . | 131 | 3 |
| El Ksour . . . | 733·92 . . | 77·0 . . | 162 | 10 |
| Sidi Sliman . . . | 880·0 . . | 77·0 . . | 245 | 10 |
| Bram . . . . | 440·0 . . | 75·2 . . | 157 | 6 |
| Oum Thiour, 2nd well | 33·0 . . | 77·9 . . | 261 | 9 |
| Metkaouak . . . | 21·34 . . | 73·76 . . | 385 | 5 |

The Artesian well at Grenelle we may add has lately been tubed afresh throughout, and the yield is said to be slightly increased. The municipal authorities of Paris are about to erect an ornamental column reservoir, staircases, galleries, &c., to receive the waters thus brought to the surface, which might be studied by our Engineers with profit.

## THE OIL-OF-VITRIOL BUGBEAR.

Dr. Letheby has not condescended to reply to our arguments, but has contented himself with reiterating his old assertions, and angrily charging us with manifesting the zeal and intemperance of partisans. Although we fearlessly challenge Dr.

Letheby, or any one else, to point out the intemperate passages in our former article, we aver that the charge of undue partisanship, even if true, comes with singular ill grace from the Doctor, who, in his controversy with Mr. Evans upon this very subject, has not scrupled to make the most unjustifiable statements—such, for instance, as asserting that *oil of vitriol* is produced by gas combustion, when, according to his own showing, the substance produced is not oil of vitriol at all, but diluted sulphuric acid, which, as he knows perfectly well, never can become oil of vitriol, or anything approaching to oil of vitriol, by any amount of spontaneous concentration *. And again, how does he justify, in defiance of all authorities, such an assertion as that to which we alluded in our last number, namely, that the *rapid* conversion of sulphurous acid into sulphuric acid, by admixture with air, "is so far an established fact in chemistry, that it need not be discussed"?

Leaving the question of partisanship to be decided by our readers, we come to the substance of his letter. In his first paragraph he writes—"It appears to me to be an acknowledged fact that 100 cubic feet of coal gas contain enough sulphur to produce . . . . 61 grains of the strongest oil of vitriol of English commerce." That coal gas *may* contain such a quantity of sulphur we have freely admitted, but that it is an acknowledged fact that it *does* contain it, we altogether deny. When Dr. Letheby made this quantitative statement at the Society of Arts, he did not present it as an acknowledged fact, but as a deduction from his own personal experiments; and, inasmuch as 61 grains of oil of vitriol per 100 cubic feet of gas is a very considerable increase upon his previous estimate of 21 grains, we thought it advisable to call his attention to the circumstance, so that he might explain away the variation, and thereby avoid that suspicion of partisanship which would otherwise disparage his results. Why should Dr. Letheby be angry with us because of the discrepancies in his own statements?

The Doctor next affirms that the presence of sulphur in gas "is injurious, and that it would be better if it were removed." Thus he continues to harp upon that which, even if it were really as desirable as he would make out, is at present, as he well knows, perfectly impracticable. Surely Dr. Letheby would exercise his ingenuity to greater advantage if, instead of creating little panics about imaginative oil of vitriol, he were to point out to gas managers a mode of doing that which, in his opinion, would be so highly advantageous. It undoubtedly would be preferable to have our coal gas freed from sulphur, not so much, however, on account of any injurious effects resulting therefrom, as on account of the prejudice which, thanks to Dr. Letheby, pertains to its presence. The Doctor appends, to this paragraph of his letter, a host of quotations which he considers as confirmatory of his views. We will remark, before concluding, upon those to which the honoured names of Faraday and Prout are attached. The remaining quotations amount to this, that coal gas contains an undeterminate but small proportion of sulphur, that this sulphur ordinarily produces sulphurous acid, that by experimenting in a particular way very dilute sulphuric acid may be procured, and that from prejudice, or advocacy of rival schemes, or want of due consideration of the enormous dilution of the sulphurous acid, of its slow oxidation, and partial neutralization, injurious effects have been attributed to its presence, which are, in reality, due to causes altogether different, and which, it is well known, were manifested and complained of long before gas illumination had been heard of.

In his last paragraph, Dr. Letheby says that we have been too severe upon Mr. Taylor. If so, we are very sorry for it. Speaking of the production of sulphuric acid by gas combustion, Mr. Taylor said: "I have seen sulphuric acid, so produced, hanging in drops from the bell-jar over the burner, and so concentrated as to destroy linen on which it had dropped." We have no hesitation in repeating our assertion that this statement is untrue, either untrue as a whole, or untruthfully described. When gas is first lighted under a bell-jar, the interior becomes lined with a film of moisture which speedily disappears as the bell-jar becomes heated; and after such a bell-jar has been in use for a long time, its interior is found to be coated, not with sulphuric acid at all, but with a dry, semi-opaque, white deposit, consisting chiefly of sulphate of ammonia. What has been done once might, we should think, be done again; but Mr. Taylor, though expressly invited by Mr. Evans, has declined to re-obtain the marvellous result above referred to. In order, however, to prove the possible accuracy of Mr. Taylor's statement, Dr. Letheby adduces some experiments of his own, performed in an entirely different manner. But he forgets to tell us that the retort under which he burns his gas contains water, or some other substance, which, by its cooling agency, enables him to condense the liquid product of the combustion,—that this liquid product, when first produced, contains a mere trace of sulphate of ammonia, but is essentially a weak solution of sulphurous acid, so weak as not to manifest the slightest sourness to the taste,—that, by exposure to the air and evaporation by heat, he chemically produces, from a large quantity of this solution of sulphurous acid, a small quantity of sulphuric acid, with which his manipulative skill enables him to corrode textile fabrics. No one doubts Dr. Letheby's ability to manufacture oil of vitriol out of coal gas, but we affirm most positively that the condensed product of gas combustion is not corrosive, and does not become so, until the sulphurous acid contained in it has been chemically converted into sulphuric acid, and until the sulphuric acid thus produced has been greatly concentrated by evaporation *. We repeat also that, in rooms lighted by gas, the sulphurous acid does not condense and cannot accumulate, and that no free sulphuric acid is produced within the atmosphere, but only sulphate of ammonia. Why does not Dr. Letheby venture to analyze the air of rooms in which gas is burning, as suggested to him years ago, instead of concocting special experiments, which are in their very essence fallacious? The only approach to a fair experiment that we know of was made by Mr. L. Thompson, who, unlike Dr. Letheby, did not stick his condensing flask or retort upon the top of a gas-burner, but suspended glass globes, containing ice, close to the ceilings of rooms highly charged with the products of gas combustion; who experimented frequently, and on an enormous scale, so as to condense even 40 gallons of liquid; but who, however, could not detect therein a trace of free sulphuric acid. The habitual production of 61 grains, or even half that quantity, of oil of vitriol, from the combustion of 100 feet of coal gas, is, moreover, a statement that requires no verbal refutation. If such were the case, gas would long ago have been prohibited from in-door consumption, on account of the fearful havoc which its use must necessarily have created.

With regard to the experiments of Drs. Prout and Faraday, we may observe, in the first place, that they were made seventeen years ago, when gas purification was very imperfect, and in rooms of which the inefficient ventilation was notorious. Dr. Prout's experiment was a very crude one. He took common water, necessarily containing combined sulphuric acid, he exposed it for a fortnight to the air of a room in which gas was burning freely, he evaporated it nearly to dryness, and he found that the residue had a perceptibly acid reaction. This eventual acid reaction was attributed to the formation of sulphuric acid, inasmuch as it was well known that 1 part of sulphuric acid in 25,000 of water manifested a distinct and immediate reaction with litmus paper. In other words, Dr. Prout, by means of a surface of cold water, condensed a portion of the sulphurous acid of the atmosphere—which otherwise would never have been deposited at all, but would have been dissipated by ventilation—and from this solution of sulphurous acid, by means of a fortnight's exposure to the air, and subsequent evaporation, he, like Dr. Letheby, appears to have concocted a trace of sulphuric acid. Professor Faraday's conclusions, on which Dr. Letheby so much relies, were expressed in the most guarded manner. He was opposed to the notion that the destruction of the leather bindings in the Athenæum library was due to the action of sulphuric acid resulting from gas combustion, but ultimately admitted that such might be the case; and he did so in consequence of observing that the destroyed leather yielded an acid liquid by infusion with water—a result at that time almost inexplicable, save on the assumption of the presence of sulphuric acid. Now-a-days, however, we know perfectly well that an acid reaction is the result, and not the cause of the destruction of leather. Acetic acid, and more particularly metacetic acid, are constant products of the decomposition of leather; so much so, indeed, that decayed leather is one of the usual sources from which metacetic acid is obtained. The knowledge of this fact gives the case an entirely different complexion. It shows that Pro-

* Gay Lussac has observed that oil of vitriol, exposed to a moist atmosphere, absorbs fifteen times its weight of water. According to Graham, dilute sulphuric acid, when concentrated *in vacuo* at the temperature of boiling water, for a period of even forty hours, still consists of two atoms of water to one atom of oil of vitriol.

† "Sulphuric acid loses, by dilution, its corrosive action on organic substances."—*Gmelin.*

fessors Faraday and Aikin, who were both strongly opposed to Dr. Prout's views, finally acquiesced in them, through the misinterpretation of a circumstance which is now perfectly explicable. As to the reactions obtained by different experimentalists with solutions of decayed leather, &c., and barytic salts, they, as Dr. Letheby will readily admit, might have been due to the presence of sulphate of ammonia or of any other sulphatic salt.

In conclusion, we will follow Dr. Letheby's example, and append a few quotations on our side of the question.

*Extracts from the Discussion upon Mr. Leighton's Paper at the Society of Arts, Feb.* 23, 1859.

Mr. SPENCER HALL, F.S.A.: It was important to investigate the action which the various substances used in preparing the different descriptions of leather had upon its durability. Calf leather, as he had said, was unsatisfactory, and the result of his own experience was, that if the fancy-coloured skins were used in binding, a heavy bill for repairs would be the result. Looking back to the old folios bound in the Dutch calf, even under the adverse circumstances of the Athenæum library, it was found that the decay was merely a natural one from the long lapse of time; but modern work showed no such durability.

Mr. HARRISON (of the London Library) confessed, notwithstanding the examples before his eyes of the destruction, attributed to that cause, that had occurred in the Athenæum library, he had lately recommended the introduction of gas into the extensive library under his care. He was in some degree led to make this recommendation from having seen that the shops of all the large booksellers in London were lighted with gas, where there were bindings of great value.

Mr. ATKINS said, in the discussion of the question of injury to libraries, it would be desirable to know how the library of the Athenæum was heated. He thought the heat of the room, independently of the gas, had something to do with the injury to the bindings.

Mr. SPENCER HALL admitted that whilst the products of gas burnt in a library had a detrimental effect upon the bindings, yet that was by no means the only enemy of books. They must not assume, therefore, that gas was the sole cause of the injury to the library, although, no doubt, in the case of the Athenæum, it formed an important element in the matter. There could be no doubt that deleterious matters were introduced in the process of tanning the leather, as also in the process of binding, an instance of which was the application of oxalic acid to the leather used in the binding of legal books. At other club-houses the books in the library had been destroyed in a similar manner where no gas was burnt, and where the dry heat alone was supposed to have occasioned the mischief. Mr. Aikin's opinion was sufficiently clear upon that point.

Mr. WHEATLEY remarked that the deleterious effects of gas in libraries were probably enhanced from the fact that a larger quantity of light was given than would be the case with other modes of lighting, and consequently more heat. He had seen libraries in which oil lamps alone were burnt, and in others wax candles, and in both cases he had found effects as destructive to the books as those which had been attributed solely to gas. In the Alfred Club the books were in a very bad state; the covers fell away from the backs in the same way as was described to have occurred at the Athenæum, and he thought more investigation than had yet been given was necessary before they could throw the whole blame of the mischief upon the gas.

Mr. JOHN BETHELL said there was one matter in connexion with the subject of the destruction of bindings which he thought had not been sufficiently noticed, that was the material that was used in cementing the covers of the books—namely, the paste. They had been told that evening that whenever books were subjected to a temperature most favourable to putrefactive fermentation—or about 70 degrees—whether gas, oil, or candles were burnt—the bindings of the books decayed. It was also stated that books kept in a closed case, without proper ventilation, upon the introduction of an increased amount of heat into the apartment, were subject to putrefactive fermentation and decay. If they took some of the substances used in bookbinding—such, for instance, as the paste—and put it into the book-cases, they would find that it would very quickly show symptoms of mould and decay. He thought gas had been rather libelled in this matter of the destruction of bindings, for they were now told that in libraries where heat was kept up, but in which no gas was burnt, the books were equally destroyed. The great evil appeared to be the high temperature that was kept up in the rooms, which was not only prejudicial to the books, but also to the readers.

*Extract from a work published at Lausanne in* 1770, *quoted in* JOURNAL OF GAS LIGHTING *Dec.* 9, 1856.

Libraries (in London) especially suffer from the ravages of the smoke. The most carefully executed bindings, preserved with the greatest care, and the most brilliant, rapidly assume the appearance of the books which in Paris have been exposed for two or three years, on the Quai de la Ferraille, to all the inclemencies of the atmosphere.

*Extracts from the Report of Dr. Leeson and Mr. Warington, in reply to Dr. Letheby's statements published in* 1854.

Without for one moment doubting the intentional accuracy of Dr. Letheby's statements, we cannot but feel that, in a case involving the character and integrity of the gas companies, the detail of the experiments actually made ought to have been appended to the report, with every information as to the dates, the *modus operandi*, &c.; we should then have been enabled to judge how far the experiments themselves were entitled to confidence, and what objections might be reasonably entertained with reference to the conclusions which have been based upon them. Every scientific observer knows how easily this might have been done, and will be but little inclined to rely on the mere deductions of an experimenter when the grounds of confidence are thus withheld.

Again, we are told that these conclusions are borne out by experiments made at the Athenæum and elsewhere years ago by chemists whose accuracy and talent we would not for a moment question; but it must be remembered that these experiments were made at a period when the methods of purifying gas were far less efficient than those at present employed, and the results simply show what can be well imagined, that the atmosphere of rooms, constructed without any ventilation, like an inverted bell-glass, to receive and contain not only the various products from the combustion of either candles or numerous gas-burners, but also the exhalations, dust, and heat of a crowded apartment, was certain to prove injurious to a material like the leather used for binding books, which, from its peculiar constitution, is very subject to decay, and when exposed to a heated and vitiated air soon becomes friable and rotten: this decay has been observed in many old libraries long before the use of gas was known.

## THE LATE GENERAL BOARD OF HEALTH AND THE WARMING AND VENTILATING OF APARTMENTS.

THE parties, who a short time since felt themselves called upon to reform every branch of practical science connected with what may be comprised under the name of Sanitary Engineering, and who undertook to prove that everything which had been done before their day was utterly at variance with correct principles, appear to have considered that nothing was too high, nothing too low, for the exhibition of their mischievous activity. Even the warming and ventilation of rooms occupied the attention of these would-be reformers, with as much energy as the consumption of smoke, or the refutation of the ordinarily received laws of Hydraulics; and as it was deemed necessary to publish sundry (so-called) minutes of information upon the two subjects last named, so now it has seemed good unto Mr. Cowper to publish—always at the expense of the rate and tax payers—the elucubrations of his friends in the homely science of Warming and Ventilation. A document published under these circumstances ought to have possessed some practical value, and it ought to have elucidated some of the obscure points of the subject so supposed to have been studied; and certainly the names of the Commissioners to whom the inquiry was referred were such as to induce the public to expect that some good would be effected by them. Their Report was looked forward to with anxiety and interest; now that it has appeared, the disappointment it has produced has been at least equal to the expectation.

For, without dwelling on the singular fatality through which the majority of the documents published under the sanction of Mr. Cowper, the late Minister (*in posse*) of Education, were characterized by the most flagrant violations of the rules of grammar, or composition—a fatality which has exercised its influence especially in the case of the Report now before us—we would observe that the document in question is so far from containing any concise view of the subject referred to the Commissioners, that no allusion whatever to the previous observations of other inquirers is to be discovered. There is a long array of experiments, the mere printing of which must have been attended with considerable expense, to show that the absorption of heat by walls, ceilings, and windows is likely to affect the temperature of a room; and that the mere fact of confining a certain number of men within a given space is likely to deteriorate the sanitary condition of the atmosphere, unless a very energetic ventilation be established. All this was known long ago, and a perusal of Peclet's "*Traité sur la Chaleur*," or of his "*Nouveaux Documents sur la Chauffage et la Ventilation*," would have saved the time and the money employed in the preparation of the very unscientific tables paraded with such satisfaction in the Report by our Commissioners. Originality is no doubt a very good thing, and there is often danger in adopting without examination the conclusions of former observers. But, if it were thus advisable to verify some of the rules laid down by M. Peclet, it by no means follows that it was right to go again over the whole of the ground he and others had already explored; and, indeed, the character of the observations recorded by the illustrious French philosopher is so far superior to that of the observations made here "by authority," that it must constitute a matter of extreme regret that the former should so completely have escaped the notice of the English Commission. The absence of allusion to the labours of previous inquirers in the same field must be explained, we fear, by the ignorance of the parties who drew up the Report before us, of the works in which they are recorded; but what opinion can we form of a body of authoritative teachers who have paid so little attention to the past history of the science they were supposed to examine and illustrate?

As to the conclusions of the English Commission, they are so self-evident, such mere repetitions of what is to be found in every elementary work on Warming and Ventilation, that no great fault can be found with them. It was long since understood that the conditions it was desirable to attain in a dwelling-room were, as stated at page 30 of the Report, "that the general body of the air in a room should be of a genial and equable temperature," though we question whether it be desirable, or even possible, to secure "the gradual decrease of the temperature from below upwards to the ceiling;" that the walls, floor, and ceiling of a room should be of nearly the same temperature as the air in it; and that the vitiated air should be replaced by fresh air. Most of these assertions are mere truisms; just as it is a truism that the materials of which the

said walls, floors, and ceilings are composed must seriously affect the conditions of the absorption of heat, a fact, however, which seems to have escaped the notice of the Government Commission. It is, indeed, difficult to exaggerate the importance of the absorptive powers of the building materials employed, and as M. Peclet's work is defective precisely in observations on this subject, the neglect of the English inquirers to supply the link still wanting is the more to be regretted. A brick wall will, for instance, absorb heat less rapidly, and, as a necessary consequence, it will part with the heat once absorbed less readily than will a stone wall; of bricks and stones themselves, the conducting powers vary within a very wide range, according to their porosity; whilst it is notorious that a wooden floor will transmit heat less readily than either a brick or a marble one, and that a common lime and hair rendered wall will be less affected by atmospheric variations (either of temperature or of vaporization) than a wall rendered with cement, whether of the so-called Roman or Parian kinds. A painted wall also will exercise a very different action upon the warming of a room than a papered one will do, and the temperature of a room lined with a flock paper will not vary so rapidly as that of a room lined with a glazed satin paper. Surely these facts required to be noticed in some way or other, if the experiments recorded were meant to prove anything, and their omission renders the experiments carried on at Whitehall comparatively valueless. The discovery that double sashes are of use in preventing the loss of heat is so much of the character of those "self-evident truths we have the advantage of hearing every day," that we may fairly ask whether it was necessary to set in motion the expensive machinery of a Government Commission for its publication; and the conclusions arrived at with respect to the merits of the different kinds of stoves are so utterly void of meaning, that the whole of this branch of the inquiry is as obscure as it ever was, in spite of the Blue-book.

The great principles with respect to Warming and Ventilation universally received amongst scientific Engineers do not seem, in fact, either to be confirmed or impugned by the labours of Mr. Cowper's Commission; and that body enjoys the enviable distinction, when compared with the majority of Commissions emanating from the late General Board of Health, of, at least, having done no harm. But there are so many questions which are still involved in doubt—connected, that is to say, with the science under consideration—that the negative merits of the present inquiry become almost reproaches to those who disposed of the resources placed at the disposal of a Government Commission. We have noticed some of these omissions on the part of those gentlemen, but there is perhaps a more important question still to be alluded to, namely, the effect produced by the direction in which a current of air is made to traverse a series of pipes, communicating warmth upon the air itself. It is said, somewhat authoritatively, that the air which passes, for instance, over a coil of horizontal pipes, whether for heated air, or water, or steam, gets into a state of gyration upon the pipes, and remains in contact with them sufficiently long to become, to use a common phrase, burnt; whilst this inconvenience is said by the same parties not to prevail when the pipes are placed vertically. Should the latter proposition be ascertained to be true, it would at once remove the great objection to the use of artificial warming as effected by pipes, and the discussion as to the merits of different kinds of stoves would cease to have much practical interest; for if it were not on account of the deterioration of the atmosphere by steam or hot-water pipes, there could be no doubt as to the superiority of a system of warming effected by them. It would be cheaper, cleaner, more equable, and more manageable, than any system of open fire-places, and it can be co-ordinated with a system of ventilation with far greater ease than would be the case with the latter; and thus we think that the neglect of the Commissioners to examine the supposed law of the movement of heated air under the respective conditions above cited is matter for regret, if not even for reproach. Might it not be worth the while of some maker of gas-stoves to pursue the inquiry in this matter?

## NOTICE OF SOME PROPOSED RIVER IMPROVEMENTS IN HOLLAND AND IN ENGLAND.

**In one of our previous numbers we incidentally called attention to a scheme which had lately been propounded for the improvement of the navigation of the Maas, between Rotterdam and the sea; and we promised to return to the subject on an early occasion. The recent discussions which have taken place** with respect to the interference with the water-way of the Thames, by the landing stages near London Bridge, and with respect to the weirs lately erected on the Nene near Wisbech, seem to have invested the abstract questions connected with tidal rivers with a direct, actual interest; and therefore it may be that the present would be the most appropriate period for examining somewhat attentively the questions involved in this obscure branch of Hydraulic Engineering. The principles which, in fact, ought to guide the efforts of Engineers for the improvement of tidal rivers are still involved in considerable uncertainty; and as the great rivers of the north-western parts of Europe exhibit the various phenomena it is necessary to study, before enunciating any such principles, upon the broadest scale, it may be desirable to seek from them all the reflex light we may be able to obtain for the elucidation of the laws likely to affect our own rivers. Whilst thus addressing ourselves more especially to the study of the continental rivers, we do not, however, propose to neglect that of our own streams; and from time to time we may seek an illustration from them; or we may suggest an application to them of the laws derived from the experience of other nations.

The whole of the district which constitutes the present Netherlands is, in fact, an accumulation of alluvial matter, either brought down from the high lands feeding the Rhine, the Meuse, and the Scheldt, or carried forward from the shores swept by the great tidal wave of the British Channel; so that the laws which affect the conditions of its watercourses depend upon the balance which may be established between the various forces able to affect the rate, or the manner of deposition, of the alluvial matters thus set in motion. Of these forces, the powers of the various streams to transport alluvial matters towards the sea, are very small in comparison with the powers of the tidal currents of the ocean to transport into the still water of this coast the matters they have previously detached from the shores exposed to their action; but the interference these streams produce with the onward march, so to speak, of the alluvions, actually gives rise to the existing peculiarities, and to the modern *régime*, of the waters in this part of Europe. We dwell to some extent upon the phrase "of the existing peculiarities of this district," because it is notorious that within the historical period a great change has occurred in the relative distributions of land and water in this part of the world; but as the existing laws affecting the balance of the various powers at work have been in operation for at least three hundred years, we may consider them to be nearly as permanent as any of their class, and reason upon them accordingly. Before, however, entering upon the discussion of the present state of the Netherlands, it may be advisable to revert, in a summary manner, to their previous changes, and thus to illustrate some of the exceptional actions to which even the most apparently stable parts of northern Europe are still exposed.

At the time of the Roman Conquest, then, it would appear from the ancient geographies, that a district, extending even beyond the present outline of the Netherlands, formed as it were a rude delta at the mouths of the three great rivers of this part of Europe—the Rhine, the Meuse, and the Scheldt. This delta was composed, in fact, exclusively of alluvial matters, brought down either from the uplands or from the tidal waves; and it consisted of a series of vast swamps unfitted for human habitation, or at best only adapted to support a rude, barbarous population of a semi-piscatorial, semi-venatorial character. Tacitus, Pliny, and the ancient geographers, describe the country of the Batavii as being so unsolid as not to yield a foothold, and they state that a huge morass, protected from the inroads of the sea by the mountains—such as they were—of blown sand, was interposed between the main branches of the Rhine and the sea. The lacus Flevo occupied a depression in this region, and it received a small branch from the Rhine, which flowed nearly in the direction of the present Yssel, and subsequently found its way into the sea through some openings in the sand banks near the Helder. About the years 1170 and 1220, however, a great change took place in this district. Large breaches were effected in the protecting ridge of sand downs, and the ocean burst in upon the former morass, until at length it converted the ancient lake, and the low lands intervening between it and the sea, into the existing Zuyder Zee. Some further change in the configuration of this district took place about the year 1277, when the Dollart was brought into its present shape; and at a still more recent period, viz., in 1421, the country around Dordrecht was brought to its present

form, and the various mouths of the Lek, Maas, and Scheldt were made to assume their present general outlines. All these changes in the configuration of the country were, it is to be observed, nearly contemporary with great disturbances of the surface of the globe; for it would appear from the Earthquake Catalogue (of the British Association) that, at the periods mentioned, the north-western parts of Europe were sadly disturbed by that class of phenomena. Since 1421, however, no great alteration of the land and sea levels of this part of Europe has taken place; and the only changes which can be noticed are those which have evidently been produced by the gradual accumulation of alluvial matters, or by the works undertaken for reclaiming the mud banks at the mouths of the various rivers, or around the various islands formerly existing near the confluence of the three great rivers above mentioned.

In saying that the littoral current, which carries forward the alluvial matters washed from the shores of the British Channel into the still water of the coast of Holland, has the most influence upon the deposition of alluvial matters in this region, we would call attention to the facts that at present we limit our observations mainly to the streams which enable the town of Rotterdam to carry on its commerce; and that, moreover, the greater portion of the alluvial matters brought from the interior by the Rhine are carried by the Yssel into the Zuyder Zee, which they seem likely, at some distant period, to fill up, in connexion with the alluvions carried into this basin from the German Ocean. In fact, from some cause hitherto unobserved, the upland waters appear to take their course through the Yssel and its derivatives, rather than through the Waal or the Lek; though the latter watercourses appear to be both more directly on the line of flow, and to be of larger area; and consequently the current in the Yssel seawards is more decidedly marked than that of the other *embouchures* of the Rhine. It follows from these facts, and from the known law which prevails in tidal rivers situated at the bottom of deep estuaries, viz., that the flood tide brings in more alluvial matters than the ebb tide and land waters can remove; that there is an increasing tendency to the accumulation of alluvial matters in the watercourses near Rotterdam; and this accumulation takes place in the most decided manner upon the line representing the resultant between the forces exercised by the flood tide and the outfall of the inland waters. In many cases the flood tide follows a very peculiar and abnormal course, and it may even, in-shore, advance in a direction precisely opposite to the one it follows in the offing; so that the resultant above referred to might be, and often is, directly opposed to the general direction of advance of the great oceanic flood tide. A projecting headland will often produce this effect in a very marked manner; and it so happens that in the case of the outfalls, or *embouchures*, of the Lek, Waal, and Naas, an interference with the ordinary direction of the flood tide is produced by the advance of the islands of Walcheren, Schonwen, and Goeree into the ordinary line of flow. At the mouth of the Nieuwe Maas, and of the Scheur, at the commencement of the flood tide, a stream sets across the last of the ebb from the river, and it finds its way into the latter only by derivation, or by being deflected from the downs on the north-east of the Hoek van Holland; thus causing the flood tide of the Nieuwe Maas to enter—at the commencement—from the north-east rather than from the south-west, as it would do were there no interference with the normal flow of the incoming tide. In consequence of the interference thus produced with the discharge of the land waters, and with the direction of the flood tide, not only is there formed a bar at the mouth of the river upon the line of still water produced by the annihilation of the velocity of the two transporting currents, but there is also a tendency to provoke, so to speak, deposit in the angle formed by the meeting of the streams; of which remarkable evidence is offered by the outline of the Hoek van Holland. The effect of these causes is, that really a vessel drawing only 8 feet of water is obliged to wait for the tide in order to get over the bar, and that a vessel drawing more than 14 feet of water cannot go up the shortest channel to Rotterdam at any time; whilst a vessel drawing more than 17 feet of water is obliged to put into Brouwershaven, and there lighten itself. In fact Flushing, the Scheldt, or the Helder are almost the only places a deeply-laden ship can safely make, at all times of the tide, between Havre and the Zuyder Zee, on the continent of Europe; and consequently the commerce of Rotterdam must always, under these circumstances, be carried on under disadvantageous conditions in comparison with the commerce of its great rivals, Antwerp and Amsterdam. So disadvantageous, in fact, must those conditions be, that if Rotterdam had not been situated at the extremity of the river navigations of the Rhine and the Maas, it is questionable whether the port could have existed. Moreover, every day tends to increase the defects of the various sea entrances to Rotterdam; for the bars at the mouths of the several streams increase by the action of the laws which originally determined them; and, as in the case of the Bergsche Veldt, the upper portions of the rivers are gradually becoming obstructed by the accumulation of the alluvial matters brought into them.

Under these circumstances, it is not surprising that the parties connected with the shipping interests of Rotterdam should endeavour to secure something like an amelioration in the state of the navigation leading to their town; and they have, therefore, with true Dutch deliberation, talked, inquired, reasoned, and written on the subject incessantly for the last thirty years or more. Beyond talk, and the publication of reports and schemes innumerable, nothing has, however, been done; and so utterly deficient are the descendants of the formerly enterprising Hollanders in every case connected with the improvement of their own country, that it is far more than questionable whether they themselves will ever really do anything. There has been published lately, however, a most elaborate "*Rapport over de Verbettering van den Waterweg van Rotterdam naar Zee,*" which seems to express the opinions of the leading Engineers of the country upon the subject; and as this Report evidently shows that public opinion leans in favour of a system which is, we think, radically mistaken, it is worthy of more than a casual notice.

The system thus proposed would consist in forming a new pass through the Hoek van Holland, and hence into the deep water, at about the head of the species of bay formed in the Downs by the impinging littoral current deflected by the advanced headlands towards the South-West. No doubt the object sought to be obtained by this direction to the new outfall of the Maas, is to shorten the course of the stream, and to reach deep water as soon as possible. But the effect of this work would be, firstly, to displace the bar; and, secondly, to lose a great portion of the scouring power of the south-western branch of the river. A project which seems to us much more rational is the one for concentrating the streams of the two branches into one outfall, and boldly carrying the leading walls of this new channel into deep water. It would, no doubt, be a costly work, and it would render necessary the simultaneous execution of a similar work near the Goereesche Zeegat; but if both these operations were combined with the improvement of the Hollandschdiep, by embanking the Nieuwe Merwede, the whole of the navigable streams of this part of Holland would be brought into a satisfactory, and comparatively permanent, condition, and a large quantity of valuable land would be reclaimed; provided always that the blunders lately committed on the shores of the East Scheldt be not repeated on the banks of the Maas. No good, however, can be effected without an enormous outlay, long-continued efforts, and perhaps many bitter disappointments. At present we do not see that sufficiently elaborate observations have been made on the tides and currents of these coasts; they may, nevertheless, exist, but they certainly ought to have formed part of the great Report presented by the Local Commission to which we have above referred. Under any circumstances, the laws affecting the deposition of alluvial matters at the mouths of rivers are so complicated, that if our theoretical criticism of the plans proposed should only induce the Dutch Engineers to publish their records of the changes on their coast, it would effect a great public benefit; for, as we shall proceed to show in a subsequent number, the same phenomena may be observed to occur on some parts of the English shores which are actually to be traced upon those of Holland. The Dutch Engineers, too, do not seem to be aware of the influence of littoral currents on the entrances to harbours placed normally to their line of flow, if we may judge by the schemes recently propounded for cutting through the Hoek van Holland, for forming a new harbour at Scheveningen, or for cutting the proposed "op zyn smallst" canal. Yet the explanation of the conditions of deposition of alluvial matters in shallow waters would be the solution of the problems connected with the improvement of the harbours not only in Holland but also in our own eastern counties. The information really before us, however, leaves no

doubt in our minds as to the relative merits of the principal schemes yet suggested for improving the Maas entrance; and most decidedly do we express our conviction that the cut through the Hoek van Holland will prove a failure.

## Circular to Gas Companies.

It would be difficult to point to any series of investigations in which the facts developed were so completely contradictory to the assumed premises which they were undertaken to establish, as in the investigations of the managers of the late metropolis gas inquiry to establish their allegations against the gas companies. We say "late" inquiry, because after the public demonstrations of dissatisfaction at the conduct of the delegates, and the disappointment expressed at the case presented to the Committee of the House of Commons, we presume that the "inquiry" is at an end, whatever other steps may be taken by the Vestries and District Boards regarding the supply of gas. But the facts that have been collected in the course of the investigations by the managers are so valuable in elucidating the actual conditions of the public lighting of the metropolis, that it is most desirable they should be clearly stated and fully understood, so that they may form data whereon to base any future legislation on the subject, should further legislation be considered necessary.

We have on former occasions pointed out how completely the evidence of the witnesses examined before the parliamentary committee disproved their own case and exposed the ignorance of the managers of the real conditions of the gas supply of the metropolis, but we reserved our comments on some of the statements they published respecting the public lights until we could add from official sources other particulars to illustrate the bearing of the facts, which without such illustration were obscure and scarcely intelligible. We allude more especially to a table, reprinted in our Journal of the 12th ult. from a publication issued by the managers, compiled from returns which professed to give the most important facts connected with the public lighting of all parts of the metropolis. The information in the columns of that table was comprised under the following heads:—Price paid for each public lamp per annum—to whom the lamps belong—who lights, extinguishes, paints, and repairs—number of hours per annum during which each lamp burns—cubic feet per hour consumed by each lamp per contract—price paid for gas alone per lamp per annum—corresponding price for 5 feet an hour from sunrise to sunset—price per 1000 feet to private consumers—price for gas alone, corresponding with 4s. 6d. per 1000 feet to the private consumer—and, lastly, price for gas alone, corresponding with 4s. per 1000 feet to the private consumer.

These returns, though inaccurate in some instances, presented on the whole a fair statement of the conditions of the supply of gas to the public lamps in such forms as the managers chose to give them. They failed, indeed, to show directly the comparative prices of gas supplied to the public lamps and to private consumers, which was the information most required; but it became evident, after a little calculation, that the price charged for the public lights is less than to private consumers, though only 13s. per lamp per annum was deducted from the gross charge for lighting, extinguishing, cleaning, painting, and repairing.

Though this fact could be deduced without much difficulty from the returns which the managers had been at much trouble to obtain, they were blind to their own lights when they exposed the fallacy of their preconceived notions, and instead of instituting a direct comparison of the prices paid per 1000 feet, they mystified themselves and others by endeavouring to show, in two columns of their table, the prices for gas alone, corresponding with 4s. 6d. and 4s.; the latter being computed from the former, and neither item of comparison having any perceptible bearing on the question at issue. The delegates and managers wish to blink the question, what is a fair price for the public lights? though Mr. Hughes and Mr. Nicholay have removed the difficulty of its solution; the former by admitting that 4s. 6d. is a reasonable charge to private consumers, and the latter by his declaration that the public and private consumers should pay the same price. For the purpose of elucidating this question, which the delegates now seem to evade, and of showing more clearly the conclusions that are to be legitimately drawn from the facts collected by the managers, we have made an analysis of their figures in a table which will be found in another part of our Journal, corrected by some returns from the gas companies which supply the particulars that were wanting to make such a representation of the condition of the public lighting complete. In this table we have given the names of each parish or district—the name of the companies supplying gas to the public lamps—the number of public lamps supplied by each company—price paid for each public lamp per annum—who provides the lamps and fittings—who lights, extinguishes, and repairs the lamps—estimated consumption of each public lamp per annum—the deduction for expenses on each public lamp which is allowed in the return circulated by the managers—net sum paid for the gas supplied to each public lamp—net sum paid per 1000 feet of gas supplied to public lamps—price of gas to private consumers—price which should be paid for each public lamp, if charged at the same rate as private consumers—undercharge upon each public lamp—undercharge per annum on all the public lamps—and, lastly, total undercharge per annum in each parish or district. The two contiguous columns in this table, of the "net sum paid for each 1000 feet of gas supplied to public lamps," and the "price of gas to private consumers," show at a glance, without any arithmetical computations, the comparative charges to the two classes of consumers; and it will be seen that, with few exceptions out of nearly 100 instances, the sum paid per 1000 feet for gas supplied to the public lamps is considerably less than the price charged to private consumers. In most of the exceptional cases the difference does not exceed the fraction of a penny, but the amount of undercharge for the gas supplied to the public lamps is frequently not less than 1s. per 1000 feet; and the general average shows that the price charged for the public lights does not amount to 3s. 9d. per 1000 feet. In the three last columns of the table the undercharge is shown on each lamp, and the total undercharge on all the lamps in the various districts of the metropolis; from which it will be perceived that an equalization of the rates to those paid by private consumers would increase the revenue of one company alone £9000 per annum in the parishes of St. Marylebone, St. Pancras, Paddington, Islington, and Hackney; and that the total difference to the Imperial Gas Company—including all the districts they supply—would be equivalent to 1¼ per cent. on their ordinary share capital.

In the foregoing statement of facts, derived from the analysis of the returns published by the managers of the metropolis gas inquiry, we have, for the purpose of avoiding questions on which there might be differences of opinion between us, adopted their allowance of 13s. per annum for the expense of lighting, extinguishing, cleaning, and repairing each lamp; though, in fact, the actual cost to the gas companies amounts to from 14s. 6d. to 18s. 6d. each, according to circumstances; and if the difference between the estimated and the actual cost be deducted from the price of the gas, the undercharge would be about 5 per cent. greater than already stated.

To be enabled fully to appreciate the inconsistency of the facts collected by the managers with the representations they were intended to support, we must bear in mind that the prominent grievance preferred against the gas companies was the exorbitance of their charges for public lighting, and assertions were confidently made that the cost per 1000 feet of gas supplied to the public lamps far exceeded the price paid by private consumers. Mr. Hughes averred that the supply of the public lamps was the most lucrative part of the business of gas companies, and he proposed the formation of a company which should be exclusively confined to the supply of the public lights at a cheaper rate, with the realization of large profits. It was no doubt expected that the returns which were sought for so actively would bear out those assertions, and that it would be shown that the parishes were paying disproportionately high prices for gas. It was, indeed, on this assumption, and in the expectation of effecting great saving of the parish money by a searching investigation into the misdeeds of the gas companies, that the vestries and district boards were induced to vote away the parishioners' money to pay for the proceedings of the managers of the gas inquiry. The result has completely falsified their expectations, and, now that the facts are clearly stated and the effect of the inquiry has been to show that the gas supplied to the public lights is charged 9d. per 1000 feet less than the price paid by private consumers in most parts of the metropolis, the difficulty which has been raised respecting the misappropriation of the parish funds for the gas inquiry will not be diminished.

We have always been of opinion that the result of the gas movement in the metropolis would be to place the public

lighting on the same footing as the supply of gas to private consumers, and now that the returns obtained by the managers have established the fact that such great inequality exists it will not be permitted to continue. Assuming with Mr. Hughes that 4s. 6d. per 1000 is a reasonable charge to private consumers, with which they are fully satisfied, there seems no reason why the supply to the public lamps should be so much less; and if the rate be equalized, the metropolitan gas companies will have to thank the originators of the gas agitation for an increase of their revenue to the extent of upwards of £32,000 per annum.

The Court of Common Pleas has set aside the verdict of the jury in a case tried about a year since before the County Court Judge at Hertford, in which the Hoddesdon Gas Company (Limited) were defendants, and a consumer whose gas was summarily cut off for non-payment of his account was plaintiff. The jury awarded him £30 damages, under the idea that a mutually binding contract had been entered into between the parties, an assumption which proved on examination to be unfounded. There could be no doubt that the decision of the jury was contrary to law; but so long as it remained unreversed by a superior court, litigous people might have been disposed to avail themselves of its authority to set their creditor at defiance. Juries are at all times apt to side with a private individual in any controversy with a public body, nor was the County Court Judge in this case quite free from this disposition. We are therefore glad to see the question set at rest by the authorities at Westminster Hall, and we regret it has been hitherto impossible similarly to review the judgment in the case of *Spratt v. The South Metropolitan Gas Company*.

The rupture which has taken place between Austria and France has been followed by a considerable rise in foreign freights, more especially to Mediterranean ports, and home freights have followed the same movement under the influence of the rise in seamen's wages, caused by the measures taken by the Government for manning the navy. The steam coal owners also have taken advantage of this state of affairs to raise the price 1s. per ton, and the owners of gas coals are already looking for higher prices. Railways and inland collieries will keep this movement in check to some extent, but we apprehend gas companies generally must be prepared for an increase in their expenditure under this head, which may press heavily on those whose maximum price of gas has been fixed in reliance upon the permanancy of the late prices of coals and freights. We have uniformly combatted the system of limiting gas companies by statute to maximum prices, unless a sufficient margin was allowed for contingencies, and a time appears to be now approaching which will prove whether we are right or wrong in the course we have taken on this subject.

The Gas Committee of the Corporation of Manchester have adopted the common-sense course of settling the vexed meter question for themselves by means of an examination carried on by the staff of officers who have been installed since the recent change in the management, and the result has been a reversal of the resolution previously adopted upon the reports of parties whose impartiality was questioned, in consequence of which the use of Messrs. Crosley and Goldsmith's patent compensating and self-adjusting meter was suspended. The trials made by the corporation officers have fully corroborated the reports made by the engineers and others to whom the meter was submitted by the patentees, and a large number of them are about to be placed at the disposal of the consumers. The gas committee have still one other measure to adopt, if they wish to set themselves right with the public, and that is to resolve upon bearing the expense of so cutting down the spouts of the meters which they have forced upon the consumers as to bring them within the requirements of Lord Redesdale's proposed Act for regulating measures used in the sale of gas. Those who are entitled to the profits of the undertaking have for many years had their profits increased by the use of high-spouted meters, and it would be unjust to burthen the consumers with the expense attending the alteration of their meters.

A special meeting of the United General Gas Company is called for to-day, to take into consideration an offer made by the Consumers' Gas Company for the purchase of their works at Cork.

At the last meeting of the Great Central Gas Consumers' Company, it was announced that the arbitrators had awarded to the company £2724 for dilapidations to the works during Messrs. Priors' tenancy of about eighteen months' duration. This is apparently a large sum, but we understand a portion of it arises under a clause in Messrs. Priors' contract, by which they bound themselves to deliver up the works in such a state of repair as would enable the company to produce 9500 feet of gas from every ton of coal carbonized, and that the arbitrators took into consideration the loss which the company must sustain through the breach of this covenant.

## Communicated Articles.

### ON THE PRODUCTION OF COAL.

By M. DE RIVIERE.

[*From the "Comptes Rendus de l'Académie des Sciences."*]

Having made observations for a long time upon the effects produced by the escape of gas in subterranean pipes, I have been struck with the resemblance that there is between ordinary earth, more or less saturated with gas, and the various strata which do not contain much combustible matter that are found in the natural basins, near their out-crop. Having thereupon compared these substances and the various circumstances, I have extended the causes by identifying the principal conditions; in this manner I found that the combustible principle, in certain beds, may probably owe its origin to the disengagement of vapours, or of gases, analogous to those known to escape from ordinary gas-pipes

In a set of experiments I found, for instance—

1. That earth which surrounds pipes was, after a certain time, and in certain circumstances, more or less impregnated with carbon to such an extent as to be sometimes very combustible, and as black as impure coal.

2. That the nature of the earth has much influence upon the absorption. Thus clay slightly damp, filled with the *débris* of vegetables or of animals, favours this absorption. On the other hand, in dry sand, the absorption is small.

3. That the thickness of the superior beds will favour absorption.

4. That at the meeting of the different beds the absorption was greatest.

5. That the absorbing matters increased in weight and sometimes even in volume.

6. That the vegetable matter was by degrees converted into charcoal more or less bituminous.

7. That ferruginous substances were altered, being more or less converted into oxides, sulphates, and sulphites, and that these ferruginous substances, and likewise a part of the organic substances, would be probably converted into sulphides or into carbonates, if the gas were less pure, if the action were sufficiently prolonged, and if certain conditions developed other reactions.

Starting from these principal data, and putting aside the details, it is easy to account for the formation of combustible minerals in many cases. When it was attempted to explain the formation of bituminous coal and of anthracite solely by the accumulation of vegetable matter, the unsatisfactory nature of the explanation was at once seen, particularly when attention was called to the presence of considerable beds of pudding-stone, and also on account of the extraordinary quantity of vegetable matter which would be necessary to produce beds of coal and anthracite of such a great thickness. This theory, though probable in certain cases, does not then appear to be applicable in every one; and thus we have been obliged to admit that the formation of combustible minerals has taken place in marshes, in the same manner as peat fields; sometimes around low islands or in the middle of archipelagos, sometimes in the deltas or embouchures of great rivers, sometimes in the beds of large rivers alternately abandoned and overflowed by the water, and sometimes even at the bottom of the sea; and we have been obliged to admit that the substances have often flowed or been carried by freshets or floods. On the other hand, we see that in coal, as in anthracite, traces of vegetables are not invariably found, and that consequently these combustibles do not appear to be formed exclusively of vegetable *débris*. Is there, therefore, anything unreasonable in admitting that in certain cases vegetables do not constitute the principal part of the combustible mass; that the carbonaceous mineral matter owes its origin to any other cause than the simple transformation of vegetables; and that vegetable *débris* should have only formed as it were the network of the carbonaceous mass? So that, if we suppose that the vapours, or gas, had arrived at the middle of this network, and admit that a sufficiently prolonged action has taken place, it is not difficult to conceive an absorption, and an accumulation, capable of producing beds of combustible matter of more or less value. We are not aware of the nature of the substances shut up in the interior of the globe, their state, and their mechanical properties, physical and chemical; but we have daily proofs that vapours and gases escape from it, and arrive at the surface of the earth. Amongst them we see sulphuretted vapours, carburetted gases, &c. There is therefore nothing to contradict the opinion that the interior of the globe is the source of carburets, of oxycarburets, of hydrocarburets, of bitumen, &c. Besides this, we know that in different localities considerable deposits of bituminous limestone and sandstone exist, evidently the result of springs of bitumen or of the escape of bituminous vapours from the interior of the globe.

Necessarily we must admit a considerable period of time for the

phenomenon of disengagement and of accumulation, as well as a prodigious volume of gas and of carburetted vapours. But what are our measures of time and volume when applied to nature, especially in estimating pressures, physical state, and combinations of which we have no means of obtaining an exact knowledge?

This hypothesis, however, far from being generally applicable, should be applied only to certain beds; it fails, for instance, to explain the ordinary deposits of lignite; and it also offers serious difficulties in the explanation of the conditions of bituminous and anthracite coal strata with beds of schist interposed, which latter are not impregnated with carburetted substances.

## Correspondence.

### PRODUCTS OF THE COMBUSTION OF COAL GAS.

SIR,—A controversy with you in the pages of your own JOURNAL is not likely, under any circumstances, to be advantageous to your opponent or profitable to your readers; and when, as in the present case, you have always shown the zeal and intemperance of a partisan rather than the candour and disinterestedness of a public writer, it is very manifest that the chances of a fair argument are still more unlikely. It would be imprudent, therefore, to enter into a controversy with you. Nevertheless, I will hazard an observation or two in reference to the remarks in the last number of your JOURNAL, on what you are pleased to call "the oil-of-vitriol bugbear."

In the first place, it appears to me to be an acknowledged fact that 100 cubic feet of coal gas contain enough sulphur to produce 40 grains of sulphurous acid, or 50 of anhydrous sulphuric acid, or 61 of the strongest oil of vitriol of English commerce; and I cannot perceive how this fact can be altered or hidden by any ingenious process of reasoning or overlaying of fine words.

In the second place, it seems to me to be also an acknowledged fact that this sulphur is injurious, and that it would be better if it were removed from the gas. This, indeed, is sufficiently established, not merely by our own remarks, but also by the observations of Professor Faraday (*a*), Dr. Prout (*b*), Mr. Aikin (*c*), Dr. Frankland (*d*), Dr. Normandy (*e*), Mr. Crace Calvert (*f*), Dr. Taylor (*g*), Dr. Griffin (*h*), Dr. Christison (*i*), and even your own advocates, Mr. Lewis Thompson (*k*) and Mr. Evans (*l*); to which I need not add the experience of librarians (*m*), and of the public generally.

Thirdly, I would observe, that no amount of negative evidence of failure of experiment will counterpoise a positive fact, and that you are rather severe as well as unjust in saying that "the result described by a Mr. Taylor as to the production, by gas combustion, of an acid liquor strong enough to corrode linen, is absolutely impossible, and is, moreover, in direct antagonism to the experiments of much abler chemists than he can pretend to be. This bold assertion of an impossible result we feel strongly tempted to call by a very harsh name—by a name not usually admitted into the pages of our JOURNAL." In proof, however, of its possibility, I will quote from what I have myself written on this subject:—"I have in my laboratory a glass retort, under which gas is constantly burning at the rate of about one cubic foot per hour, and I have never yet seen it free from sulphuric acid—ounces, in fact, have dropped from it; but this does not represent more than a small fraction of that which has escaped and found its way into the atmosphere, and thence into the pores of delicate fabrics" (*n*). With this liquor I have corroded linen and other kinds of textile fabrics; and rather than argue about the possibility of such a result, I would show it in actual operation.

HY. LETHEBY, M.B., PH. D., &c.

*Laboratory, London Hospital, April* 30, 1859.

(*a*) In the summer of 1842 a committee of the Athenæum Club was formed to ascertain the cause of the great mischief done to the bindings of the books. Mr. Faraday, Dr. Prout, and Mr Aikin gave evidence before the committee, and they agreed that the mischief was due to the gas, and that the fumes of it ought to be carried out of the room. Mr. Faraday was not at first disposed to attach much importance to the sulphur of the gas, but on further investigation he said: "It is very probable that sulphurous acid in excess becomes ultimately present in the leather of the binding exposed to the air of the room, and if so, it would account for the whole effect." At a subsequent meeting of the committee, he stated that he had examined two of the books, and that the quantity of acid present in the backs of them surpassed his expectations. They tasted strongly of acid, which was in a free state, and that there was not the same quantity of acid in the leather obtained from the binder as in the books referred to.

(*b*) Dr. Prout stated that he had taken two equal quantities of the water used in the house, and had exposed one portion in a saucer to the air of the drawing-room of the club-house for a fortnight, when he found that there was a striking increase of sulphuric acid, and on evaporating it nearly to dryness, it distinctly reddened litmus, and showed the presence of free sulphuric acid. "This," he said, "distinctly explains the destruction of the books, nor will there be any improvement till the gas is either removed, or its fumes conducted away by appropriate chimneys."

(*c*) Mr. Aikin agreed with Dr. Prout in his opinion.

(*d*) "In conclusion, its purity of composition and freedom from all substances which can, during combustion, produce compounds injurious to furniture, drapery goods, &c., give the hydro-carbon gas great advantages over coal gas, which always contains more or less bisulphuret of carbon, a volatile substance that has hitherto defied all attempts to remove it or diminish its quantity by any process of purification, and which, during combustion, generates sulphurous acid, the compound to which all the mischief produced by coal gas is probably owing."—*Dr. Frankland: Journal of Gas Lighting*, vol. ii., p. 126.

(*e*) "I have no doubt that, if Dr. Letheby will do me the favour to repeat the experiments with the above-mentioned gas (the Imperial), he will find that the statement I have just made is in strict accordance with truth, and confirms most thoroughly his own words, namely, that 'if there is not a means of preventing the presence of sulphuric acid altogether, there is, at any rate, a means of keeping it down,' not, indeed, 'to one-half' but to nearly one-fourteenth 'of its present amount.' I should, however, say at once here, that there is considerably more sulphuric acid *eventually* produced by the combustion of the above-mentioned quantity of gas, than can be detected by this method of analysis, or by that adopted by Dr Letheby, since these methods only take into account the almost insignificant quantity of sulphuric acid formed at that period, but fail in arresting the sulphurous acid which in reality, by its subsequent spontaneous oxidization, is the chief source of the mischief complained of."—*Dr. Normandy: Journal of Gas Lighting*, vol iii., p. 502.

(*f*) "I believe it my duty to state that there cannot be a doubt on the subject of the combustion of gas being a source of serious injury to the bindings of books in public libraries; and some of the facts stated by Dr. Letheby in his valuable letter were noticed by me in an examination which I made of decayed bindings in some of the public libraries of this city, and my observations were published in a notice which appeared in the *Transactions of the Society of Arts*, vol. lvii., p. 120, 1851."—*Mr. Crace Calvert: Journal of the Society of Arts*, vol. vii., p. 275.

(*g*) "Gas cannot be deprived entirely of sulphuretted hydrogen without losing much of its illuminating power; and there is no process known by which it can be entirely freed from the vapours of bisulphuret of carbon. It is owing to the presence of these bodies that coal gas while burning produces sulphurous acid, which is not only offensive to respire, but very injurious to furniture. The library of the Athenæum Club was some years since extensively damaged by the sulphurous (becoming sulphuric) acid evolved from the gas burners."—*Dr. Taylor: Pharmaceutical Journal*, vol. viii., p. 137.

(*h*) "On several occasions when gas has escaped in the laboratory, I have gone to see whether my bottle of bisulphuret of carbon were safe, so completely has the unmistakeable odour of the vapour of that substance overpowered the naphtha smell that belongs to coal gas. I need hardly dwell on the destructive effects of such a gas in shops and dwelling-houses; curtains, paper-hangings, pictures, the binding of books, and metal goods of every description, must be speedily discoloured or rusted by the continued action of the acid thrown off from its flame; whilst the breathing a confined atmosphere, tainted with sulphurous fumes, as well as hot and vitiated, must be equally deleterious to health."—*Dr. Griffin: Pharmaceutical Journal*, vol. xvi., p. 167.

(*i*) In a letter to me on this subject, Dr. Christison states that he has always found a little sulphuric acid in the water formed by the combustion of gas; and he attributes the following results to it—namely, the withering of plants in the rooms of Edinburgh, the bleaching of the upper part of the curtains, and the discoloration of silver.

(*k*) "If Dr. Letheby had wished to investigate the purity or impurity of the Central gas, he ought to have attended most minutely to the quantity of bisulphuret of carbon contained in it; for this is, after all, the only thing in ordinary coal gas worth calling an impurity." (*Journal of Gas Lighting*, vol. ii., p. 358.) "Mr. Leigh, '*korri bile dictu*,' knows nothing of bisulphuret of carbon; a ten years' experience even has left him ignorant of the most remarkable properties of this constant ingredient of coal gas." * * * * * And, "coal gas seldom contains less than 1-1000th of its bulk of its vapour of bisulphuret of carbon"—a quantity equal to 1191 grains of sulphur in 100 cubic feet of the gas.—*Journal of Gas Lighting*, p. 205.

(*l*) "I can assure Dr. Letheby it is the wish of all gas companies to discover a means of abstracting the very small portion of sulphur which is left in the gas after it has undergone the processes at present known for that purpose; and I can promise Dr. Letheby, if he, as a chemist, can devise some plan to effect this, he will do far more good than by an attempt to decry one of the most useful inventions of modern times."—*Journal of Society of Arts*, vol. vii., p. 329.

(*m*) See my report on coal gas to the Commissioners of Sewers, May 9, 1854, for the opinions of Mr. Spencer Hall, of the Athenæum library; Mr. Brayley, of the London Institution; Mr. Stone, of the Royal College of Surgeons; Mr. Thornhill, of the Literary and Philosophical Society of Newcastle-on-Tyne, and others.

(*n*) *Journal of Society of Arts*, vol. vii., p. 274.

## Register of New Patents.

2325.—WILLIAM EDWARD NEWTON, of 66, Chancery Lane, London, for "*Improvements in apparatus for lighting gas and other lamps.*" A communication. Provisional protection only obtained. Dated Oct. 18, 1858.

This invention relates to a means of lighting gas and other lamps by electricity or the discharge of a galvanic battery.

In all former efforts to light gas or other lamps by means of electricity, the gas, &c., being ignited by passing the electricity through the jet of gas, one of the main difficulties to be overcome, has been so to generate, control, and apply dynamical electricity both in quantity and in intensity as to bring the batteries or generators within practical and feasible limits both as to space and expense.

Another difficulty has been, where the current has been used for this purpose, so to gauge or regulate the battery with reference to the size of the platinum wire to be heated, and the length of the circuit through which the current is to be sent, as always to secure the heating of the wire to a degree required for ignition, and yet avoiding fusion.

Still another difficulty has been where a current of electricity is passed through a platinum wire for this purpose, a current of wind striking upon the wire is liable to reduce the temperature of the igniting wire below the point which is requisite to produce ignition of the gas or other lamp.

The object of the present improvements is to overcome these difficulties, in part, by removing the platinum wire altogether from the circuit, excepting so far as it may be found desirable or necessary, to tip the ends of other conducting wires with platinum, and to employ what is called "the discharge" or "spark" for effecting ignition in place of the current, whereby the wire has been hitherto heated to redness to effect the intended object.

In carrying out the invention, a battery is connected by wires with an inductive apparatus, and this apparatus is again connected by wires with platinum points. The discharge from one point to another across a space

is effected by opening and closing the circuit at a small wheel attached to the inductive apparatus. A second battery is connected by wires with the magnet for operating an armature, and opening and shutting the gas-burner. A magnet is fixed underneath the bed-piece, with the poles approaching near the armature. A lever is attached to the armature, and extends back under a part which is supported upon the pivot points of screws fixed in the stands of the apparatus. A spring connected with a paul is placed underneath the armature lever. This paul is made to act on a ratchet-wheel fixed to the burner. Carefully insulated copper wires are connected with the inductive apparatus, and platinum points are connected with the insulated wires and brought opposite to each other over the top of the burner. The burner with the various connecting parts is designed to take the place of ordinary gas-burners and cocks.

The operation of the parts is as follows. When the circuit of the battery is closed, the magnet is charged, and attracts the armature to its poles. This raises the armature lever, which, by extending back, causes a movable piece to rotate upon its pivot screws, thereby throwing some of the parts back towards the burner. At the same time another piece is thrown forwards, and carries with it the spring which is connected with the paul, that engages with the ratchet-wheel, which is thereby turned round one tooth. Each time the circuit is closed this operation is repeated, thereby turning the burner round one tooth each time till the holes in the parts of the burner are brought into correspondence, when the gas issues. The parts may be arranged so as to require these circuits to be closed any given number of times. The gas-burner being now opened, a discharge from the battery and inductive apparatus is effected through the jet of gas from one point to the other by turning the wheel, which completes the circuit of the battery and inductive apparatus, and instantly the gas is ignited. To shut the gas off, it will only be necessary to close the circuit of the battery a given number of times, till the holes in the burner are out of correspondence, and then the gas will be shut off.

2333.—John Richmond, 21, Carlisle Terrace, Fairfield Road, Bow, Middlesex, engineer and machinist, for "*The construction of valves applicable especially to water-meters and other instruments for measuring fluids and all hydraulic purposes.*" Provisional protection only obtained. Dated Oct. 19, 1858.

The quarter rotary valve is constructed and made of iron, brass, or other suitable metal. The chief improvement in these valves is to reduce friction. The valve is of the disc construction, and is so made that it can be eased off the face without loss of water or any other fluids that it may be applied to, by which means it requires a very little power to work the same, and will give a full flow of water or any other fluid that may be passing through it. The faces of the valves will become better through wear, which is not the case with ordinary valves. The upper disc is constructed with a hollow box, and being moved a quarter round will give either egress or ingress to the required passages, and at the same time will be quite tight on the face. The spindle of the upper disc does not come through the valve, but is kept up in the lower box by a cylinder, and can be regulated as required.

2368.—Edward Clarence Shepard, of Jermyn Street, Westminster, Middlesex, for "*Improvements in electric lamps.*" Patent dated Oct. 23, 1858.

This improvement consists in certain means of controlling the position of the electrodes, by which they are kept properly in contact with each other, as they are reduced by oxidation and by the disengagement of particles when the current of electricity is of large volume and low intensity, or preserving a proper and uniform distance of separation when the current used is of high intensity. The difficulty of keeping the carbon pencils pointed has resulted in part from many of the particles of carbon being carried over from the positive to the negative electrode by the current of electricity, which current, as generated by the ordinary galvanic battery, is constant in one direction. With a view to obviate this objection, a mechanical pole-changer is applied to the conducting-wires of the ordinary galvanic battery, which traverses the current of electricity at frequent intervals. In using a current of electricity generated by a magneto-electric machine, the change in the direction of the current is accomplished by dispensing with the use of the rrottem-plate or pole-changer, which is generally used in such machines to produce a constant current.

The claim is for the employment in an electric lamp of an open seat contained in a stationary bridge-plate, or its equivalent, and receiving the electrode in such a manner as to allow the point only thereof to protrude through it the distance required, and permitting the advance of the said point so fast only as it is oxidized and reduced by the electric current substantially as described. Also the combination of a loaded tube carrying the upper electrode, the open seat, and the mercury tube, in which floats, and is secured, the lower electrode, substantially as described; so that while the upper tube feeds the upper electrode down to the open seat as fast as it is reduced, the lower electrode is also fed up as fast as reduced and kept in its proper position with reference to the upper electrode.

2414.—John Dransfield, of Waterhead Mill, Oldham, in the co. of Lancaster, hat manufacturer, for "*Certain improvements in cocks, taps, or valves.*" Provisional protection only obtained. Dated Oct. 29, 1858.

This improvement consists in the novel employment and use of a hollow plug conically formed, the narrowest part or apex of the cone being uppermost, and to which the handle is attached. This hollow conical plug is furnished with an outlet, and has its exterior surface bearing against the interior surface or seating of the tap or valve; it will thus be evident that the pressure of the water within the hollow plug will retain the said plug against its seating, the flow of water being caused by turning the said plug, as usual, by a handle or otherwise.

2487.—Wilhelm Ziervogel, of Hettstädt, Prussia, for "*Improvements in apparatus for distilling products from bituminous coal, schist, peat, and other like substances.*" Patent dated Nov. 6, 1858.

This invention has for its object improvements in apparatus for distilling products from bituminous coal, schist, peat, and other like substances. For these purposes a series of upright retorts are used, which are kept constantly supplied at their upper ends with the coal or material to be distilled, and the retorts constantly discharge the coke or spent matters at their lower ends. These retorts are set in an enclosed chamber, which is heated by a suitable furnace or furnaces. The heat and products of combustion from the furnace are caused to circulate around and amongst the lower parts of the retorts, and then they pass into the upper part of the chamber, and thence away to a chimney or shaft. Above the chamber in which the retorts are set or fixed (and which is heated as above explained) there is a chamber into which the coal or other bituminous substance which is to be distilled is fed by the aid of feeders, which are closed and opened in such a manner as to prevent the passage away of the distilled products or vapours. The lower part of this upper chamber is kept constantly supplied with the coal or other bituminous substance, and when necessary this substance is broken into pieces of about one inch cube, so that the space in each retort may be kept constantly filled from top to bottom with the bituminous substance. It is preferred that the lower part of each retort, where it is subject to the gentlest heat, should be of clay, or protected by clay, whilst the upper part of each retort is by preference of cast iron. The coke or spent products are removed, from time to time, from the lower ends of the retorts, which are formed conical, and such spent matters are received into a chamber below, from which they are continuously removed by means of a screw. On the inside of the retort, and in the centre thereof, is a tubular screw, which is caused to rotate slowly therein. The hollow screw in each retort is of considerably less diameter than the retort, and the space between them is filled with bituminous substance. The hollow screws are perforated with numerous holes or slits to allow of the evolved products passing into the interior of each screw, and from thence such products pass through hollow branch pipes, which act as or support bearings on the inside of the retorts to support the hollow screws. There are two branch pipes or hollow conduits from the screw in each retort, and these are connected to a general main pipe, by which the products are, by the aid of an exhausting apparatus, conducted to a condenser to be condensed; and there are also branch pipes leading to the same main pipe from the upper closed chamber, where the bituminous substance is introduced in order to keep up a continuous supply to the retorts, the upper ends of which, as before explained, open into this upper chamber. The heat applied to the retorts is to be such as to distil off products which will condense, and not to produce incondensible gases. The rotation of the hollow screws in the retorts aids the bituminous substance to descend within the retorts. The vaporized products obtained are to be conducted to and condensed in an ordinary refrigerating apparatus, such as has been used before for like purposes.

It is not new to obtain from coal and other bituminous substances, by the application of heat, products which are liquid or solid at natural temperatures, as various arrangements of apparatus have been used for that purpose. No claim is made to any of the parts separately, but what is claimed is the mode herein described of combining apparatus for distilling products from bituminous coal, schist, peat, and other like substances.

2491.—John Richmond, engineer and machinist, of 21, Carlisle Terrace, Fairfield Road, Bow, Middlesex, Joseph Quick, jun., and Alexander Fraser, civil engineers, both of Sumner Street, London, for "*Construction of a meter for measuring water, spirits, or any other fluids.*" Patent dated Nov. 8, 1858.

The ram meter is constructed and made of a cylinder of iron, brass, or any other metal, and divided in the middle by a stuffing-box, which is adjusted by screws through the cylinder cover. The ram which works in the cylinder is made of iron, brass, glass, or any other material; it will move through the stuffing-box in the cylinder, a sufficient space being left for the water, spirits, or other fluid that may be passing through the meter. The end of the ram is continued through the cylinder cover by a small rod, the end of which is connected to a slide or slot motion, by which means the length of stroke of the ram is indicated. The water, spirits, or other fluid which is passing through the meter will be thrown at the top or bottom of the ram by a quarter-rotatory valve, four-way cock, slide, or any other valve. The motion which is given to the cock or valve is constructed of quadrant catches, released by a camb or lever, moved by the lever of the slot motion from off the arm, by which means the cock or valve will be moved instantaneously, so that no water, spirit, or other fluid which may be passing through the meter will be lost or not registered by the return of the arm top or bottom. The water, spirit, or other fluid will be registered by an index attached to the meter.

The shape or form of the apparatus may be greatly varied, and the mode of working the valve or cock may be differently arranged.

The claim is for the application of a plunger or plungers, or arm or arms, working in a cylinder or cylinders, to the purpose of measuring water, spirits, or any other fluids. Also the application of a hollow disc valve for the purpose of passing the same alternately to either end of the cylinder or cylinders, or for any other hydraulic purpose, but more especially in connexion with water-meters of any description.

## PROVISIONAL PROTECTION

HAS BEEN GRANTED FOR THE UNDERMENTIONED INVENTION.

897.—Robert Brown, of 5, St. Paul's Churchyard, in the City of London, for "*Improvements in stoves and apparatus for warming and ventilating apartments and buildings.*" April 9, 1859.

## NOTICES HAVE BEEN GIVEN OF INTENTION TO PROCEED WITH THE UNDERMENTIONED INVENTIONS.

2952.—William Beckett Johnson, manager for Messrs. Ormerod and Son, Manchester, engineers, for "*Improvements in the employment of gas for generating steam, and in engines connected therewith.*" Dec. 24, 1858.

2975.—William Taylor, of Nursling, in the co. of Southampton, gentleman, and William Dakin Grimshaw, of Southampton, engineer, for "*Regulating the admission of natural atmospheric air and eduction of rarefied air or gases from hot-houses or any other place or premises, and for supporting a required temperature.*" Dec. 29, 1858.

177.—William Edward Newton, C.E., of 66, Chancery Lane, for "*Improved apparatus for measuring water and other liquids.*" Jan. 20, 1859.

647.—Thomas Patstone, of Birmingham, warehouse clerk, for "*Improvements in shades or glasses for gas and other lamps, and in the supports of the said shades or glasses.*" March 14, 1859.

# Legal Intelligence.

## COURT OF COMMON PLEAS.

WESTMINSTER, FRIDAY, APRIL 29.

(*Sittings in Banco before the* LORD CHIEF JUSTICE, *and Justices* CROWDER WILLIAMS, *and* BYLES.)

HAZLEWOOD *v.* HODDESDON GAS COMPANY.

This was an appeal from a decision of the County Court Judge sitting at Hertford, a report of which appeared in this JOURNAL on June 8, 1858, in a suit commenced under the following circumstances:—The respondent kept a large school at Hoddesdon, which had been warmed and lighted by gas supplied by the appellants. There was no contract between him and them except such as might be inferred from the circumstances. The appellants found the meter, for which the respondent paid 5s. a year, and every quarter an account of the quantity of gas consumed was sent in and paid. On the last occasion when the inspector looked at the meter he found that it showed a considerably less consumption than in the corresponding quarter. This gave rise to a suspicion that the meter had been tampered with by somebody, and disputes arose. The respondent offered to pay the amount of the corresponding quarter, but the company claimed a larger sum, inasmuch as the respondent during the last quarter had used gas-stoves, which had not existed in the corresponding quarter. When the meter was taken away, it appeared that the pipe had been removed, and had been put together again in a clumsy way. As the parties could not come to terms, the company cut off the gas, and the respondent thereupon sued in the county court, and recovered damages for the injury which he had sustained in consequence of the gas being cut off.

Mr. LUSH (with whom was Mr. Codd), for the appellants, submitted that under the circumstances the respondent was not entitled to damages.

The LORD CHIEF JUSTICE said the important question was whether, even supposing the company wrong in believing that the meter had not correctly registered, they had not the right to say, "We will supply you with no more." The respondent's contention was, that the company ought to have sued him for the amount due in the county court, and still have gone on supplying him with gas. He himself could not see that there was any contract at all between the parties.

Mr. LUSH: And if the company were bound to continue the supply, for how long must they continue it—for ever? The question was one of great importance to country gas companies, which had no special Act of Parliament like the London companies. These special Acts gave power to cut off the gas.

The LORD CHIEF JUSTICE said he could not see what difference there was between a butcher supplying the school with meat and a company supplying it with gas. Surely each had a right to discontinue the supply.

Mr. LUSH submitted that there was no contract to make the case different from one of an ordinary character. The company were anxious to know whether they could cut off the supply of gas; and if not, for how long they must continue the supply. There was also another point, which only went for a new trial. The respondent claimed £30 for the value of some gas-stoves which he had put up, and which were useless without gas; but this sum it was clear he could not recover. The judge, however, had told the jury that they could give damages on that ground.

Mr. Justice CROWDER: It would be an awkward thing to have gas cut off suddenly.

Mr. LUSH: But the interest of the gas company was a guarantee against their doing that without good cause.

The LORD CHIEF JUSTICE: And customers could protect themselves by special contracts.

Mr. BAYLIS, for the respondent, contended that a contract to continue the supply could be inferred from the circumstances of the case.

The LORD CHIEF JUSTICE was of opinion that there should be judgment for the appellants, and that a nonsuit should be entered. The learned judge before whom the case was tried put it to the jury that there was evidence of a contract to supply the respondent with gas, which could not be determined without proper notice. The court was of opinion that that view of the learned judge was erroneous. There was no evidence at all of the contract. It was said that a contract might be inferred from the surrounding circumstances, and no doubt that was true in many cases; but he saw nothing here from which to infer a contract. The company was established to supply gas, and the respondent had occasion for gas for lighting and warming, and he adapted his premises to receive it; but there was nothing which would have bound the respondent to take gas for a single moment longer than he pleased to do so. If there was no contract which would have bound the respondent to take gas, no more could it be inferred that there was a contract binding the company to continue the supply longer than they were minded to do so. He felt the force of the argument that one might be subjected to great inconvenience by the sudden withdrawal of gas, but the same might be said of an infinite variety of articles supplied by tradesmen in other lines of business. It was not because the company had a monopoly in the supply of gas that the court should infer a contract which would not be inferred if the matter related to a different trade. He saw no contract to supply or to receive gas longer than it suited the will or the caprice of either party.

Judgment for the appellants.

## SOUTHWARK COUNTY COURT.

TUESDAY, MAY 3.

(*Before* C. J. WHITMORE, *Esq., Q.C.*)

HOULGATE *v.* SURREY CONSUMERS' GAS COMPANY.

The plaintiff brought his action for damages caused by the gas company cutting off his supply-pipe, although holding a deposit of his in their hands. The facts having been gone into on a former day, his honour said that he would look over the company's Act, and reserve his decision. The parties were in attendance again this day by appointment.

His HONOUR, in delivering judgment, said this was a claim of damages against a gas company for cutting off the supply of gas to the plaintiff's premises. The defendants allege that they were justified in so doing, because there was rent due for gas theretofore supplied, which the plaintiff refused to pay, and the question is whether the defendants could legally treat it as rent due. The company derives its statutory powers from the statute 17th and 18th Vic., c. 94, with which is incorporated the Gas-Works Clauses Act, 1847 (10th Vic., c. 15). Its own Act gives it no monopoly of supply; and amongst other provisions, that in sec. 55 clearly contemplates the possible co-existence of other companies for supplying gas within the same limits. That section is as follows: "All pipes which shall be hereafter laid down by the company within the limits of this Act shall be of such construction, or shall be so marked, as that the same may be easily distinguished from the pipes of any other company or person supplying gas or water within the same limits." It is therefore under no obligation to supply any particular individual with gas, and its doing so must be matter of contract only. This is more especially shown by section 39 of its own Act, and section 13 of the general Act, by which the company is empowered to make such contracts for the supply of gas, and upon such terms as may be agreed upon. In the present instance a contract upon certain terms was entered into with the company—namely, that a deposit of 30s. should be paid to the company, and which should be kept in hand for at least four quarters. Such terms appear to be perfectly reasonable in the case of an unknown customer, and by them the plaintiff is bound. Before the expiration of the period of four quarters, the plaintiff, contrary to the terms of the contract, sought to apply the 30s. so paid to the discharge of by-gone rent for gas, and refused to pay more than the difference. By so doing I think that, in effect, he left a portion of the rent unpaid, and the company were entitled to resort to the powers given by section 16 of the general Act, by which it is provided that where rent is due they may cut off the supply of gas. They have, in my opinion, a full justification for the course they took, and are entitled to judgment. I may perhaps add, with reference to the case which was cited in the course of these proceedings—that of *Spratt v. The South Metropolitan Gas Company*—that I have been furnished with a copy of that company's Act, and I find it is quite different from the one under which the present defendants proceed. I suppose the learned judge who decided that case was of opinion that the statute created a monopoly, and that the privilege of exclusive supply carried with it a corresponding obligation to supply unconditionally, and I take it that that was the ground of his judgment. I am not prepared to say that I should dissent from him in that opinion, and therefore I shall leave that case by remarking that I do not consider it was at all a parallel case to the one under consideration. And I may further remark that by the judgment just given I would not be understood to countenance the doctrine put forward by the gentleman who appeared for the defendants—that a company constituted as this is may, if so disposed, capriciously and arbitrarily discontinue the supply of gas to a consumer. I think, on the contrary, in the case of this company, a very little evidence would suffice to raise the inference of a contract between the company and the consumer for a determinate period, and in the absence of anything else to show what that determinate period might be, in all probability the parties would be considered to contract with reference to the provisions of the statute; and, as the statute enacts that the gas may be cut off only where rent is in arrear, it might easily be understood to mean that the supply was to be continued until the gas rent was in arrear. Until that period, therefore, the company having commenced to supply gas would not be entitled to cut it off. I do not stutter this judicially, but it is my personal opinion; for I do not think it reasonable to suppose that it is intended the company should have power despotically to cut off the gas of a consumer whenever they please, for otherwise parties may have their gas cut off at any period. I think the deposit having been paid would further the presumption of such a contract having been entered into; and besides this, the fact that the statute gives the company power to cut off the gas when the rent is in arrear, would imply that it is not to be cut off except under such circumstances.

Mr. SCHOMBERG, who appeared for the company, said: Will you allow me to make a remark? I am afraid that in attempting to explain something the other day, I have appeared to commit an error. I quite agree with you, sir, that the gas is not to be cut off capriciously; and if any remark which I made seemed to further the contrary supposition, I was in error. I believe the power given to cut off the gas is only in cases of non-payment of rent or fraud.

The JUDGE: I have very little doubt that that was your intention in making the remark, and I only wish to guard against its being inferred that I sanction the other opinion by the judgment I have just given.

Judgment for the defendants accordingly.

# Miscellaneous News.

## GREAT CENTRAL GAS CONSUMERS' COMPANY.

The Ordinary Half-Yearly Meeting of this Company was held at the London Tavern on Friday evening, the 29th ult.—Mr. Deputy DAKIN in the chair.

The notice convening the meeting having been read, and the corporate seal affixed to the register of proprietors,

The CHAIRMAN read the following report of the directors:—

Your directors, in conformity with the provisions of the Act of Parliament, have again the pleasure of meeting their shareholders, and of reporting to them the position of the company at the present time, as well as the results of the working of the past year.

The balance-sheet for the year ending Christmas last, as examined and certified by the official auditors, is already in the hands of proprietors, and shows the precise state of both capital and revenue accounts.

The balance brought forward is £6951. 16s. 7d. After deducting the usual £1200 for the depreciation-fund, there will remain £5751. 16s. 7d. available for the purpose of dividend, after providing for the usual trade and working expenses, out of which the directors recommend a dividend at the rate of 6 per cent. per annum, free of income-tax, payable on and after the 30th day of May next to those proprietors whose names stood in the company's books on the 15th instant: this will leave a balance of £587. 0s. 7d. to be carried to the next half year.

The directors have much pleasure in calling the attention of the shareholders to the increase of rental during the past twelve months as compared with the corresponding period of 1857, and which amounts to £2712. 17s. 10d.

The illuminating power and chemical quality of the gas has been satisfactory, as will be seen from the following report from Dr. Letheby to the Commissioners of Sewers.

"In the course of the whole year, the average illuminating power of the gas has been equal to that of 12·68 standard sperm candles, or 14·49 wax. These are results of 604 experiments made at the College Laboratory and at Coleman Street. The quarterly averages were as follows:—

| | Sperm of 120. | Wax of 120. |
|---|---|---|
| First quarter, ending in May, 1858 | 13·38 | 14·15 |
| Second ditto, ending in August, 1858 | 12·11 | 13·84 |
| Third ditto, ending in November, 1858 | 13·25 | 15·14 |
| Fourth ditto, ending in February, 1859. | 12·98 | 14·83 |
| Average for the whole year | 12·68 | 14·49 |

"The chemical quality of the gas has been remarkably good, for, with but few exceptions, the gas has been perfectly free from sulphuretted hydrogen, and it has rarely contained more than mere traces of ammonia, and its associate the fœtid tarry matter.—I have the honour, Gentlemen, to remain, your obedient servant,

"*Guildhall, Feb.* 14, 1859." (Signed) "HENRY LETHEBY."

During the latter part of the past year and the commencement of the present, the contractors to the company failed to give that regular and sufficient supply of gas to the consumers which they were bound to do under their contract, and so serious was the failure, that the directors deemed it their duty immediately to take possession of the works under the provisions of the contract, and they have the satisfaction of stating that the transfer has been amicably arranged between the company and Messrs. Prior—the company receiving a sum of £2724 for dilapidation of works, and paying the value of the stock of coals and implements as settled by the respective

engineers and their umpire, and receipts in full satisfaction have been mutually exchanged.

Since the 29th of January the company have manufactured their own gas, and your directors have every reason to be satisfied with the change, as from that time complaints have ceased, and, although their experience is yet limited, while they are confident of giving for the future an ample supply to the consumers, they have reason to think there will be no material increase of cost to the company.

The following report from the company's engineer will place very fully before the shareholders the present state of the works, as well as a statement of the further plant and repairs that may be required during the present summer :—

"*London, April* 29, 1859.

"*To the Chairman and Directors of the Great Central Gas Consumers' Company.*

"Gentlemen,—In my last half-yearly report I informed you that Messrs. Prior had accepted your works as in good working condition for the purposes of their contract. This acceptance was, however, conditional on your engaging to erect certain new plant and machinery, and to complete some necessary repairs.

"The whole of this work was completed within the specified dates, excepting the six benches of retorts, the responsibility of erecting which Messrs. Prior undertook upon your agreeing to pay them a certain specified sum.

"The entire responsibility of supplying your consumers with gas under the contract, therefore, rested with your contractors, and we had every reason to expect that the supply would have been carried on with satisfaction to the public. But owing to the non-completion of these six benches of retorts, which Messrs. Prior had intended erecting upon a new plan, and the occurrence of long-continued fogs, there was a failure on their part to produce the necessary supply of gas at the end of last year and the commencement of the present.

"To meet the consequent difficulties, my energies were taxed to the utmost, and I was able to erect rapidly three new settings, and to obtain a supply of Boghead coal, and these two requisites being accomplished, carried the company over the difficulty.

"Since that period you have deemed it incumbent on you to put an end to the contract and to take upon yourselves the entire responsibility of the supply of gas to your consumers.

"It is gratifying to find that this step has been taken without incurring the expenses attendant on legal proceedings, and also that the sum awarded by the arbitrators is such as will represent the dilapidations arising out of your late contractor's tenancy.

"On the 29th of January last, we commenced the manufacture of gas, since which period the supply has been of a satisfactory kind. The time which has elapsed since then is so short that it is impossible to estimate the exact difference of cost, if any, to the company in the new position in which they are placed. Judging from my general experience, I have a well-grounded hope that even if gas should be manufactured at a somewhat higher price, the facilities we shall have of adapting the commodity we sell to the convenience of the consumers, and thereby promoting increased business and maintaining our works from year to year in a more perfect state of repair, will compensate for any slight increase in the cost price likely to arise, and that the company's property may be looked upon with even more confidence than it was prior to this change taking place.

"I also stated in my last half-yearly report, that some additional works for the purposes of purification had been agreed upon.

"These were for the purpose of carrying out Mr. Laming's process of purification, and the expense was to be borne jointly by Messrs. Prior and the company. At the termination of our connexion with Messrs. Prior, it became necessary to effect an amicable arrangement in respect to this machinery, and it has been agreed that if Mr. Laming's process is satisfactory, the whole apparatus shall be handed to the company for the sum of £1600, and, if unsatisfactory, for the sum of £1100. This latter sum will fairly represent the value to the company of certain apparatus useful under any circumstances. Supposing the latter event to take place, it will be necessary to expend a sum of about £1500 for new dry-lime purifiers during the present season, to prevent any just cause of complaint of nuisance on the works.

"The roof of the retort-house is now about to be renewed and the walls raised. A lavatory and dining-room for the workmen is also required, at an expense of, say £1500.

"The £2700 awarded by the arbitrators will, as I have already stated, be about sufficient to restore the works generally into good working condition.

"A. WRIGHT."

Four of your directors, Messrs. Virtue, Massey, Bovill, and Clemow, retire in conformity with the provisions of the Companies' Clauses Consolidation Act, and being eligible for re-election, offer themselves accordingly.

The subjoined statements of accounts, as certified by the corporation auditors, having been in the hands of the proprietors for some days before the meeting, were taken as read.

*Dr.* BALANCE-SHEET, TO DECEMBER 31, 1858. *Cr.*

| | | | | | | |
|---|---|---|---|---|---|---|
| To paid-up capital | | £164,410 | 0 | 0 | | |
| Ditto new shares | | 7,750 | 0 | 0 | | |
| | | | | | £172,160 | 0 0 |
| Creditors on debentures | | | | | 66,600 | 0 0 |
| Ditto on bills payable | | £9,919 | 18 | 10 | | |
| Ditto | | 8,705 | 4 | 8 | | |
| | | | | | 18,625 | 3 6 |
| Dividends unclaimed to date | | | | | 436 | 14 10 |
| Interest on debentures | | | | | 1,634 | 12 3 |
| Arbitrators' award, third instalment | | | | | 517 | 10 6 |
| Revenue account, for balance to date | | | | | 6,951 | 16 7 |
| | | | | | £266,325 | 17 8 |

| | | | | | | |
|---|---|---|---|---|---|---|
| By cash at bankers, viz.:— | | | | | | |
| General account | | £1,164 | 11 | 3 | | |
| Dividend ditto | | 436 | 14 | 10 | | |
| Debenture interest ditto | | 19 | 2 | 6 | | |
| | | | | | £1,620 | 8 7 |
| Stock (pipes, bends, branches, tubing, &c.) | | | | | 2,674 | 3 2 |
| Gas rents, arrears, &c., for quarter ending Dec. 31, 1858 | | | | | 29,701 | 16 9 |
| Lands, works, plant, mains, meters, services, &c. | | £210,973 | 12 | 3 | | |
| Preliminary expenses | | 20,602 | 14 | 7 | | |
| Office furniture and fixtures | | 753 | 2 | 4 | | |
| | | | | | 232,329 | 9 2 |
| | | | | | £266,325 | 17 8 |

This company is liable under an award, dated Jan. 16, 1858, to pay the sum of £2089. 4s. 4d. in four half-yearly payments of £522. 6s. 1d. each, payable on the 1st of April and the 1st of October; and a further sum of £6727. 17s. 1d. in thirteen half-yearly payments of £517. 10s. 6¼d. each.

*Dr.* REVENUE ACCOUNT, FROM DECEMBER 31, 1857, TO DECEMBER 31, 1858. *Cr.*

| | | | | | | |
|---|---|---|---|---|---|---|
| To cost of gas for year ending Dec. 31, 1858 | | | | | £27,271 | 15 10 |
| Interest | £ 232 | 0 | 7 | | | |
| Ditto on debentures | 3,298 | 17 | 4 | | | |
| | | | | £3,530 | 17 11 | |
| Directors | £1,000 | 0 | 0 | | | |
| Chemical referees | 133 | 10 | 0 | | | |
| Official auditors | 46 | 10 | 0 | | | |
| Corporation inspector | 100 | 0 | 0 | | | |
| Meter-testing | 23 | 13 | 0 | | | |
| Solicitor's charges | 293 | 14 | 6 | | | |
| Salaries | 2,011 | 9 | 0 | | | |
| Trade charges | 1,668 | 2 | 0 | | | |
| Stationery | 359 | 11 | 6 | | | |
| Wages | 1,465 | 2 | 6 | | | |
| Meter-fixing and paving | 1,109 | 0 | 9 | | | |
| Rent, rates, and taxes | 1,731 | 1 | 6 | | | |
| Bad debts and allowances | 942 | 9 | 0 | | | |
| | | | | 10,882 | 3 9 | |
| | | | | | 14,413 | 1 8 |
| Balance carried down | | | | | 16,825 | 10 8 |
| | | | | | £58,510 | 8 2 |
| Dividend declared April, 1858 | | | | £2,475 | 0 0 | |
| Ditto October, 1858 | | | | 4,125 | 0 0 | |
| Income-tax | | | | 200 | 0 0 | |
| | | | | | £6,800 | 0 0 |
| *Extraordinary Expenses*— | | | | | | |
| Amount expended in general repairs of works, from Dec. 31, 1857, to Dec. 31, 1858 | | | | | 3,663 | 19 9 |
| Arbitration *in re* Croll—balance of expenses | | | | | 892 | 13 8 |
| Arbitrators' award, first instalment, due April 1, 1858 | | | | £ 522 | 6 1 | |
| Ditto, second instalment, due October 1, 1858 | | | | 522 | 6 1 | |
| Ditto, third instalment, due January 1, 1859 | | | | 517 | 10 6 | |
| | | | | | 1,562 | 2 8 |
| Balance carried forward | | | | | 6,951 | 16 7 |
| | | | | | £19,870 | 12 8 |

| | | | | | | |
|---|---|---|---|---|---|---|
| By gas supplied to the consumers and the public lamps, for the year ending Dec. 31, 1858 | | | | | £58,431 | 5 8 |
| Premiums on new shares, transfer fees, &c. | | | | | 79 | 2 6 |
| | | | | | £58,510 | 8 2 |
| Balance brought down | | | | | £16,825 | 10 8 |
| Ditto from last revenue account, as per official auditors' statement | | | | | 3,045 | 2 0 |
| | | | | | £19,870 | 12 8 |
| Balance brought down, being amount available for dividend | | | | | £6,951 | 16 7 |

The CHAIRMAN: Gentlemen, we have carefully drawn up this report, and I think that, taken in connexion with the elaborate report of our engineer, it will so completely have put you in possession of the state of the works, and the condition of the company, that it will require very little address from me. The balance-sheet, which is the important document, you have had duly handed to you for several days, and it will have enabled you to judge of the financial position of the company, and how we have arrived at the conclusion to which we point in the report just read to you. If you will turn to that balance-sheet you will find on the debit side that the only addition, as compared with the balance-sheet of last year, is one which appeared in the half-yearly accounts before submitted to you, namely, "New shares, £7750." In point of fact, the capital account stands exactly as it did when we last met you—there has been no addition to it. On the credit side of the account you will find that the sum expended since the beginning of last year, and during the whole course of the year, has amounted to £6664. 19s. 1d. The sum expended at the end of the previous year, *i. e.*, to December 31, 1857, was £204,308. 13s. 2d., as against £210,973. 12s. 3d. at the present time, and the following are the items occasioning the additional expenditure:—Blue billy pits, engine-house and boiler-house, £1071. 11s. 5d.; new steam-engine (which is working most admirably), £805; new exhausters, £913. 15s. 6d.; new chimney, £521. 16s. 6d.; new coal stores, £937. 5s. 1d.; and plant taken from Mr. Croll under the arbitration, £1614. 6s. 5d. These are all most valuable additions to your works, and are now doing their duty remarkably well. In addition to this there are meters supplied during the year, £283. 18s. 7d.; services, £301. 13s. 8d.; and mains laid, £215. 11s. 11d.; making the total sum of £6664. 19s. 1d. which has been added to the capital account of the company during the year. If you turn to the revenue account you will find the gratifying fact that the rental of the last year has come up to—has rather exceeded—the sum which I ventured to prophesy this time last year it would do—viz., £58,431. Contrasting that with the revenue of the year previous, which was £55,718, you will perceive that there is a gain of £2713, and that, I think, is very satisfactory. The shareholders will remember that the first half of last year was not a productive one, owing to the slackness of trade and the general brightness of the atmosphere, so that our rental for that period did not exceed that of the corresponding period of 1857; but during the last half year, notwithstanding the disadvantages under which we have been working, we have brought up our rental to an increase of £2700, which, as I said before, I think is a very satisfactory state of things. While on the subject of rental, I may state that I have had drawn out a statement of the rental of the company from its commencement, which I think it will interest you to hear. The first year, from September, 1850, to September, 1851, was £33,358; from 1852 to 1853, £47,606; from 1853 to 1854, £45,987; from 1854 to 1855, £48,413; from 1855 to 1856, £54,228; from 1856 to 1857, £55,718; and from 1857 to 1858, £58,431; showing that there has been a steady and gradual rise. I hope we shall go forward now with an accelerated pace. On the other side of the revenue account, you will find some difference with regard to the charges. You will observe that under this head the salaries are £2011. 9s. as against £1689. 4s. This is owing to the services of our engineer, and I am sure you will not regret that circumstance. There is likewise an increase in the trade charges; they were £1291 last year; they are £1666. 2s. this year. That is owing to a large number of meters having come under the

hands of the company for the purpose of repair. We are very careful, whenever it is reported that meters are in the slightest degree out of order, to have them all back, for our great anxiety is to have them all in proper order; and it is to these circumstances that the increase in the trade charges, by the difference between £1291 and £1666, is due. There is a slight increase in wages, but that is only in proportion to the increase of rental—viz., £1465. 2s. 6d. against £1322 of last year. Therefore, deducting the trade charges—with that exception—and taking the increase of rental into consideration, you will find that part of the balance-sheet, I think, very satisfactory. I now come to the most interesting portion of the balance-sheet—those small figures in the corner, which denote the sum available for dividend—and I think, if the shareholders consider the special circumstances under which we have been placed during the past year, and the large amount defrayed for extraordinary expenses, they must be satisfied that there is a great amount of elasticity in the company; that its foundation is good; and that it is in a safe and sound condition; for notwithstanding these large expenses, which are quite exceptional, it has not so much diminished the amount available for dividend. You will find that the extraordinary expenses for general repairs of works from December, 1857, to December, 1858, amount to no less than £3663. 19s. 9d. There is an item here which we shall not see again, nor anything analogous to it, and which consists of the balance of the arbitration expenses in Mr. Croll's case—the final balance on that head being the large sum of £800. But I say that, notwithstanding these large payments for greatly exceptional expenses, we have brought down the sum of £6951. 16s. 7d. as available for dividend. That would be equivalent to a dividend of 7½ per cent.; and considering the large amount of expenditure upon the works, we might be justified in regarding it as so available, but I am sure you will agree with the directors that the true policy is one of prudence, and will concur with them in the recommendation that, before considering this sum as available for dividend, we shall deduct £1200 for depreciation. Deducting that amount, we shall still be able to give you 6 per cent. free of income-tax, carrying over £587 to the next account. I may mention likewise that the directors have had under consideration, speaking of a reserve-fund, the necessity, now that we are in altered circumstances, of having such a fund upon a larger scale still; and we think, after the best consideration we can give the subject, that by keeping our works in that position in which we should like to keep them, and putting by £2000 a year, which we should recommend you to do, we shall soon arrive at that period of safety which we most earnestly desire. In the report we have given you an account of the termination of the system of gas-making by contract, which was the system upon which we originally started. You know—at least, many gentlemen near me know—the circumstances under which this company was started. We obtained our Act of Parliament, we obtained the money of the proprietors upon the system of manufacturing gas at 1s. 4½d. by contract, and the directors have felt it their duty, as I have stated here before, to exhaust that principle before adopting a new one. We had every reason to believe that our late contractors, who were gentlemen well known in the coal trade, engaged in large transactions, and who gave us security for the performance of their contract, would have satisfactorily carried out that contract; and no doubt to a considerable extent they did, in the early part of their engagement, satisfactorily perform it, but towards the end of the last year—many persons present must be aware of it—we were in a most unfortunate condition. I assure you, if you had known the anxiety which the directors and the engineer had at that period, you would feel that our lot was no bed of roses. The contractors had delayed, notwithstanding repeated remonstrances on the part of the board, the execution of some necessary parts of the work, and one of the difficulties in dealing with a contractor is that, if the board of directors had at all interfered with the execution of the works, however necessary it might appear, it vitiates the contract, and all the responsibility falls upon them. We could therefore only remonstrate, and urge repeated promises which had never been kept. The fog coming completed the disaster, and at the end of last year and the beginning of this, it required every effort and ingenuity of your engineer, and the utmost forbearance on the part of the consumers. I must pay a compliment, a deserved compliment, to our engineer, who was untiring in his efforts on the occasion. We employed all his services, and his credit, too, to obtain a supply of Boghead in order to carry us through; and we were carried through with little loss, but it was a lesson not to be thrown away upon the directors. We therefore determined, whatever might be the increased cost of procuring gas, that we would no longer be subject to a chance so serious as the chance we had just gone through. As we told you before, we had entered into the contract with Messrs. Priors warned by our past experience, and we had put into that contract a power which enabled us to take instantaneous possession of the works, and we had made arrangements so as to have no dispute as to what was to be paid on such an emergency. We put the works into complete order—the retorts were all new, and the contractors were to pay the difference when this state of things happened between the then state and that of new retorts. Our contract was so cautiously drawn, that we have been able with no trouble—some little anxiety, but very little trouble—to get possession of the works, and to get from the contractors the amount exhausted of the productive plant of the works, and we have them now in our own hands in a perfect condition. Now, gentlemen, I am sure that you will think this has been a wise and prudent step. We already feel the difference in the management. We have, since the 29th of January, had literally no complaints; we have had not the slightest difficulty to manufacture the proper supply of gas, or in distributing it with the greatest facility; and I believe, though it is early to make a statement on that head, that there will be but little increased cost, if any. But, if there should be, we shall be amply compensated by the increased confidence we shall establish, and the increased rental we shall receive in the City of London. Gentlemen, I do not know that I have any further remark to make. I shall be happy to answer any question which may be put to me, and shall content myself by moving the adoption of the report which I have had the honour to read.

Mr. Low suggested that the motion should be to receive the report, instead of to adopt it.

The Chairman said, if the report and statement of accounts were adopted, the special recommendations contained in the former could be dealt with hereafter. There were two recommendations which would form the subject of two separate motions—viz., the dividend and the directors.

Mr. Low said, if that were so, he would second the adoption of the report.

The motion was then put and carried unanimously.

The Chairman moved, "That a dividend be now declared for the half year ending Christmas last, at the rate of 6 per cent. per annum, payable on and after the 30th of May, 1859."

Mr. Abiss seconded the motion.

Mr. Kelsey said he thought the rate of dividend might be considerably increased, for he perceived that the board recommended the same dividend in June last, when the rental was £2000 less.

The Chairman said the dividend for the last half year was at the rate of 5 per cent. But the question was, whether they should not lay by £1200 as a depreciation-fund? If so, then they could only pay 6 per cent. now.

Mr. Kelsey said there was an item on the credit side of the balance-sheet which he wished to have explained—"Preliminary expenses, £20,602. 14s. 7d." What was the meaning of that?

The Chairman said that that very particular item and amount had stood in the company's account for the last seven years, and the proprietors had had it before them fourteen times. It consisted of the expenses originally incurred in forming the company, the three applications to Parliament before they obtained their Act, and all those engineering and parliamentary expenses which those who bought a parliamentary title knew to be the consequence.

Mr. Kelsey said the item had been in the accounts before.

The Chairman said it was the price at which the company got possession of the streets of London, and authority to light them.

Mr. Kelsey thought it was only encumbering the accounts to bring this item forward on all occasions.

Alderman Gabriel reminded the honourable proprietor that the directors had expended the money, and it was necessary, whenever they made a statement of accounts, to show what they had done with this sum.

The Chairman, in reply to another shareholder, explained that the difference in the amount of the capital account arose from the issue of new shares.

Mr. Low said there was a sum of £6950 brought down, which the official auditors reported was available for dividend, but of that sum the directors had proposed to set apart £1200 as a depreciation-fund. They also proposed that in future the sum so appropriated should be £2000 annually. Of course, they would then do away with the present depreciation-fund?

The Chairman: Oh, yes; it is not an additional fund. We propose to increase the £1200 to £2000 annually.

Mr. Low challenged the directors or their solicitor to show him any clause in the company's Act or in the Gas Clauses Consolidation Act which would authorize or justify them in setting aside one single sixpence to form such a fund, except that one which became operative only after paying a 10 per cent. dividend, and reducing the price of gas to 3s. The attempt, therefore, to do this was flying in the face of the Act of Parliament. He did not question the prudence of the directors in seeking to create such a fund, if they could legally do it; and he had no objection to the 6 per cent. dividend, provided the balance of profits was kept as a rest. If the directors would do that, he should sit down content; if not, he should propose that the dividend be at the rate of 7 per cent.

The Chairman said he would give Mr. Low some information. This matter had been had over before, and Mr. Low had given them a very learned legal disquisition upon the subject, and certainly he was quite right in his law. But then there was this in it—The law allowed them to deal with all the profits of the company in the shape of dividend up to 10 per cent., and when they had attained 10 per cent., they had no power to make a reserve-fund. But Mr. Low knew that, with the exception of one year, they had not divided 10 per cent.; and therefore the shareholders had a perfect right, up to that point, whatever the profits might be, to put aside such a sum as they, like prudent men, might deem advisable, without infringing upon the Act of Parliament. Mr. Low was quite right so far, that the company could not divide 10 per cent. from the beginning, and then put aside a reserve-fund; but when that condition arose, they must go to Parliament and see if they could not alter their constitution.

Mr. Low begged the chairman's pardon for differing with him, but maintained that there was no clause in the Act of Parliament to enable the directors to form a fund, otherwise they might divide 2 per cent. among the shareholders and set aside all the rest.

The Chairman said, We could.

Alderman Gabriel said if the directors had recommended them to divide all the profit brought down, it would be dividing more than was earned, inasmuch as a great portion was gone in wear and tear of works. They would not require £1200 every year. They might perhaps save it next year, but in the following year they might have repairs to do which would absorb the whole of their savings. They had had such a case just now. When they took the works from Mr. Croll there were heavy works to execute which took away the whole of the reserve-fund. So that, in fact, it was only putting by what was yearly required to be laid out upon the premises. They were not dealing as yet with the condition of things contemplated in the Act of Parliament, because they were not in reality forming a fund, but only putting by a sum taken out of the works which they would have to replace. Looking at it in that light there was no difficulty whatever in dealing with it. When the directors talked about forming a fund and putting by more than was required for the fair wear and tear of the works, then they would have to deal with the Act of Parliament.

Mr. Low said it appeared to him that setting apart this £1200 a year, and contemplating setting apart £2000 a year, was forming a fund; if not, then it dropped into the "rest." There he agreed with the board, but if they talked about going to form a fund he should oppose them, because he challenged any one to show a clause in the company's Act which authorized or excused their doing so.

The Chairman: After paying 10 per cent.?

Mr. Low said that had nothing to do with it. He knew that on one occasion the auditors did make a little mistake in this matter, but after consideration they put a right construction on the Act of Parliament, and they knew that they were not justified in putting the item into the accounts in that form. Formerly, when they recognized this depreciation-fund, they put in, "By balance brought down" only; then they repudiated their own judgment, and afterwards put it, "By balance brought down available for dividend."

The Chairman said he did not question the power of the meeting to divide every shilling of the balance year by year if they liked, and then, having no reserve-fund, to say, "We must issue fresh shares in order to pay for the deterioration of works." No doubt it was in their power; but then Mr. Low discussed two questions. He showed his acumen as a lawyer, but then his good sense as a man of business came in, and he said, "I think it prudent, and I would advise you not to do it."

Mr. Low: I admit that if you keep it as a "rest," you are right; but if you fly in the face of the Act of Parliament, and form a fund, I shall divide the meeting on the point.

The Chairman: That we shall not do; we are well advised; we shall take care not to do that.

Mr. Low: Then do I understand that you recall the notion of forming a fund, and that you will keep the balance after dividing 6 per cent. as a "rest?"

The Chairman: Clearly, that is our intention. It is our intention to equalize your dividends, so that in no one year, from repair of works, you shall suffer in your dividends. We wish to keep them uniform, and to get the 10 per cent. as soon as we can.

Mr. KERRY thought that the chairman and Mr. Low really proposed exactly the same thing, and that the apparent difficulty might be overcome if, instead of creating a fund, the balance was put aside for depreciation year after year. There was no doubt it was a wise arrangement to put by £2000 a year, and he would be very sorry indeed to see the whole of the profits of the company divided and put into the pockets of the shareholders without some such provision being made.

Mr. LULHAM said the proper way to do it was to alter the wording, and call it a "wear and tear account."

The CHAIRMAN: I quite agree that either Mr. Kerry's or Mr. Lulham's mode would do. But that is not *our* balance-sheet. You see the balance-sheet as soon as we do. The official auditors take the Act of Parliament for their guide, and take upon themselves the mode of stating the accounts. We have asked them to alter it, and they won't.

Mr. LULHAM: I do not think £1000 each half year is too much for a legitimate wear and tear account for so large a plant as you have now. To keep the plant and machinery in proper order, you will find you will have no change out of your £2000 a year. Your works have been in a very inefficient state, and I hope they will now be put into the most efficient state of any works in the metropolis.

The CHAIRMAN: We are going to put a new roof on this year.

Mr. LULHAM: It wants it bad enough; I see it is beautifully honeycombed. There is one item in the account upon which I wish to say a word—the additional charge for the engineer. That is the best item in the whole account. I am happy to bear my testimony that you are in a better position than you have been since you were a company. You are now in the true position of a gas company. You ought never to be buyers of gas any more than you ought to be buyers of corduroys or woollens, but you ought to be your own masters, and to make your own gas. I am happy to hear a very high character of your engineer. From information I have gained in other companies with which I am connected, I know that your engineer is spoken of as a gentleman of first-rate talent. Having that, you have everything before you. I hope soon to realize an 8 per cent. dividend again.

The motion was then put and carried, and, on the motion of the CHAIRMAN, the retiring directors re-elected.

Mr. SAMUELS inquired where Mr. Bovill was, as he had not been seen among them a long time.

The CHAIRMAN: Mr. Bovill has been an invalid for a long time. I saw his brother yesterday, and I am gratified to hear that he is much better. He has unfortunately had a long and severe attack of illness. His best wishes and services have always been at our command, and very valuable they are, as an engineer.

Mr. BADGER: I have no doubt before we separate some gentleman will propose a vote of thanks to the chairman and directors of this company for their very valuable services, not only during the last year, but for many years past. A vote of thanks from a company like this is no doubt very valuable, but there is something in a more substantial form that they deserve for the very efficient services that they have performed—a slight reward in the shape of money. Therefore I have much pleasure in moving this resolution—"That the sum of £1000 be paid to the directors for their services to the company from the 1st of January, 1858, to the 1st of January, 1859."

Mr. THWAITES: I have very great pleasure in seconding that proposition. It is a matter, I am sure, of congratulation, that we have a body of directors who are able to watch over the interests of the company, especially as we have had the benefit of their exertions during a very critical period of the company's existence. The change which has recently taken place was a period, no doubt, of great anxiety to the directors, as it necessarily would be to our excellent engineer, to whose talents I am bound to bear my humble testimony, along with my friend on the right. There is only one thing that has grated upon my ears this evening, but I did not like to object to the course pursued, because it might appear as if I had an objection to the gentlemen who have just been elected. I have always held, in any company with which I have been connected, that it is better, when directors have to be elected, that the names should be announced, and that the proprietors should propose those directors. I know it is only a matter of form, because the same result would have been brought about had any individual proprietor proposed those directors. But I do think, as a principle, that it is desirable the directors should simply announce the names of those directors that retire, and leave the body of proprietors to propose and second their re-election. In the present instance one can mention it with less fear of giving offence, because I am quite sure that there would not have been a single hand held up against any of the directors that have been proposed by our worthy chairman. And I am also equally clear that there was no intention on their part to exercise any influence over you in the election. I am simply speaking upon a broad principle, which I have always held sound in public companies, that it is better that the directors should abstain from formally proposing those of their colleagues when they come up for re-election. I have great pleasure in seconding the motion that the sum mentioned should be granted to the directors for this year.

Mr. BANNISTER: I beg to ask whether the present moment is the proper time for this circumstance to take place. I do not wish to say one word against our directors, but, looking to the fact that we have a large debt against us, and looking at the circumstances of the company, I do feel a little surprise at hearing this brought forward. I am connected with railway companies, some of them of large magnitude, and £1000 per annum appears to be a "respectful" sum to vote to the directors, especially under the circumstances under which we stand.

Mr. LULHAM: I quite agree with the last speaker, that it is not the proper time to bring the matter forward. I have spoken upon this matter once or twice before. I think the amount ought to be settled so that it never ought to be brought before us again. The £1000 a year is a permanent matter that the directors are to take for their services. I do not like, every time the directors are to receive their £1000 a year, that they should come here and have it voted to them. A thousand pounds a year is not too much as a permanent amount for their services, and it ought not to be brought forward at every annual meeting.

Mr. Bannister having been informed that this was not an extra sum voted to the directors, but only their ordinary remuneration, apologized for the remarks he had made.

The motion was then put, and carried unanimously.

Mr. NEWSOM said the proprietors had been waiting a considerable time for the Lord Mayor to have the roast beef at the works, and he should like to know when it was to come off. Now that they had got a proprietor who was Lord Mayor, he thought it ought to come off this summer.

Mr. BAKER: I think you are under a mistake. It was not the Lord Mayor; it was Mr. Pearson.

Mr. NEWSOM: No, the Lord Mayor; and we were to wait his convenience.

Mr. BAKER: "There's a good time coming."

The CHAIRMAN: We are going to put a new roof on the retort-house, and we shall soon be very smart, and we will take it into our serious consideration.

Mr. KERRY: I am sure you will not separate to-night without according a vote of thanks to the chairman and his colleagues for the efficient manner in which they have conducted our affairs during the past half year. Gentlemen, when I look around us and see the miserable mismanagement which has caused one joint-stock company after another to fall like a house of cards before the mildest form of public scrutiny, and when we perceive how one director after another has been made to tremble in his harness, we can well appreciate the sound and judicious management, and the high principle, and the integrity, which have been shown by the directors of this company. I am sure we shall most cordially, without my expressing anything further upon the matter, give to them our best and warmest thanks.

Mr. LULHAM seconded the motion, which was cordially agreed to.

The CHAIRMAN, in acknowledging the vote, said: On behalf of my colleagues, and on my own account, I beg most cordially to thank you for this mark of your confidence. We feel inspirited by it. We have no doubt a more arduous duty to perform now, in one sense, though one much less anxious in another. I do not expect to be summoned by telegraph from Brighton, as I was on an early day in the present year, and have to come up post-haste. We shall have more continuous labour, but, I am convinced, with less care and anxiety to ourselves; and I likewise feel convinced it will be with greater satisfaction to the consumers who honour us with their confidence, and likewise with greater results to your dividends and profits. Gentlemen, we beg to thank you for this mark of your confidence.

Mr. LULHAM: Your business is all done; but I made up my mind to speak to you about your coke. Your coke is a very serious matter. I am very sorry to tell you that there is a very large heap; and the heap does not seem to decrease, but rather to increase, according to my estimate of the amount at the works. Coke rather depreciates the longer you keep it. I hope you will use your best means to get rid of it.

The CHAIRMAN: As a consequence of the transfer of the works from the contractor to ourselves, we took his coke in addition to what we are making ourselves. I am glad to say we are reducing that by about 300 chaldrons a-week above what we make now, and I hope soon we shall arrive at the conclusion which every shareholder must desire.

Mr. LULHAM: It looks like a mole-heap: it is constantly increasing.

Alderman GABRIEL: That large heap of breeze is not ours; it belongs to the contractor.

The proceedings then terminated.

## CHARTERED GAS COMPANY.

The Half-Yearly General Court of Proprietors of this Company was held on Friday, the 6th inst., at the company's works, Horseferry Road, Westminster—B. HAWES, Esq., the governor, presiding.

The SECRETARY (Mr. Burls) read the notice convening the meeting and the minutes of the last general and special courts.

The following report was taken as read, as were also the statements of account, which will be found on page 266:—

The trading accounts and balance-sheet of your manufactory, for the half year to Christmas last, are now submitted to your inspection, and, as your court of directors anticipate, to your approval.

The rental for light, if compared with the corresponding period of the previous year, shows an improvement of £4143, and the various products of £1750. These advantages, however, have been somewhat counteracted by a larger expenditure for coals, wear and tear, &c.—a considerable portion of the latter being to reinstate the retort-beds at the Curtain Road station.

Your court of directors feel justified by the state of the accounts (which have been duly audited) to recommend to you a dividend at the rate of £7. 10s. per centum per annum, free of income-tax, and to be forwarded in the usual way.

The proceedings of the committee appointed by Parliament to inquire into the supply of gas by the metropolitan gas companies, have engaged the vigilant attention of your directors, who are glad to assure you, that no case has been proved against the companies by the parish delegates, but, on the contrary, admissions have been elicited, showing that the arrangements adopted by the companies have already benefited the public, and must still further promote their interests—a result indeed which can be delayed, only by the indulgence of groundless apprehensions.

Your court of directors revert to the decease of Francis Witham, Esquire, in order to testify their respect for his memory, and to state, for the information of the proprietary at large, that John Sale Barker, Esquire, has been elected an auditor of the company as his successor.

Mr. PERRY moved, and Mr. RHODES seconded, the following resolution, which was carried unanimously:—"That this meeting do agree with and confirm the report of the court of directors and the auditors' report and statement of accounts of the company so transmitted."

The GOVERNOR brought up the following report from the court of directors:—"Directors' minutes, April 21, 1859. Resolved,—That a dividend at the rate of £7. 10s. per centum per annum, for the half year ending Christmas last, be now declared and reported to the general court of proprietors to be held on the 6th of May next;" and he moved the following resolution thereupon—"That the dividend declared by the court of directors be approved and adopted, and be payable by warrant upon the treasurer on and after the 16th of May inst."

The resolution was carried unanimously.

The GOVERNOR: Now, gentlemen, it has been a great pleasure to me ever since I have occupied the station which you have placed me in, that I have had every year, hitherto, to give you an increased dividend; and this is the first time I have ever had a less one to propose. But when you consider that the early closing of the shops has caused a very great diminution in the quantity of gas supplied to tradesmen, you will not be much surprised at it. We want a counteracting influence to this state of things, and we have it to a considerable extent in the vast increase which has taken place in our private lighting. I hold in my hand a list of the additional private lighting which we have received during the past year, and it includes the names of the Dukes of Cambridge, of Manchester, and of Grafton, the Duchess of Beaufort, the Marchioness of Salisbury, the Earls of Cork and of Uxbridge, Lord Ward, with several others in the same way, amounting in the whole to 789 additional lights; so that you see, gentlemen, we have increased in one direction, though we have been injured very materially by the early closing movement, which, I hope, has improved the morals of our youth. Whether it has done so or not, I don't know; but I think, generally speaking, the more that young men have to do, the better for their morals, than is likely to be the case if they walk about the streets doing nothing. I hope, I say, it is so, as they have now so many opportunities for improvement. I know several young men who were last night at a *soirée* given by the Microscopical Society, at which I understand there were 3000 persons present; and if so, that is an evidence of an improvement and a desire to benefit their minds, so that these opportunities are not all thrown away. Now, gentlemen, I think from what I have stated to you, so far as it goes, is a cause for very great encouragement, and a proof that we are going on in a very healthy condition. I do lay it down as a principle, that I do not consider any man can better deposit his surplus capital, which he does not want, in a safer bank than in the Chartered Gas Company. Amidst the vast depreciation which has just taken place in the value of property, our shares have stood the test;

and while many a man has had to go home to his wife and family at night with the melancholy prospect before him that all his property will be lost, our proprietors may go home with smiling countenances and say, "My property is not only not diminished, but there is every hope of its improvement." Therefore, gentlemen, I do trust you will feel satisfied and gratified upon the whole with the appearance of your affairs, and will see that you have every reason to be grateful for the promising situation in which you stand. There is such a decided increase in the quantity of gas which we send out, and which my friend, Mr. Beck, who has paid great attention to these matters, will be better able than I am to give you an account of, and I think that what he will convey to you will give you pleasure, and that you will go away with renewed confidence in the management of your concerns.

Mr. RHODES said he observed that the accounts sent to the proprietors were marked, "Examined and found to agree with the books of the company." He hoped the auditors thoroughly examined the matters, and had access, not only to the books of the company, but also to all the vouchers necessary.

The SECRETARY said they had access to everything necessary.

The GOVERNOR: They have vouchers for every shilling.

Mr. RHODES inquired whether there was any intention on the part of the directors to issue any more of the unappropriated shares?

The DEPUTY-GOVERNOR (Mr. Beck) said they had no such intention at present.

Mr. RHODES: How many unissued shares are there?

The DEPUTY-GOVERNOR: About 7500.

Mr. RHODES asked what was the meaning of the item in the balance-sheet, "Half cost of exhauster-house," and whether the other portion of the cost had been defrayed?

The DEPUTY-GOVERNOR said the charge had been run over four half years, and they had only now debited this account with £284.

Mr. RHODES: What makes your law expenses so large, comparatively speaking?

The DEPUTY-GOVERNOR: It arises from the fact that an action was brought by Mr. Hills in respect of a mode of purifying gas, in defending which all the companies joined. It is a very heavy matter indeed, and we had to pay our proportion. He gained the action, and a new trial has been moved for, but it will not come on for hearing until next term.

Mr. RHODES said he had seen a report in a newspaper of a quantity of coal having taken fire on the company's premises, and he should like to be informed whether they suffered much loss from that event.

The DEPUTY-GOVERNOR: Very trifling. We are constantly having such things happen from spontaneous combustion, through the coals having got wet in the barges.

Mr. BOX: What is the quantity of gas that has been manufactured during the last half year?

The DEPUTY-GOVERNOR: The quantity for the last half year of 1858 was 511,738,000 cubic feet, as compared with 476,000,000 in the corresponding half of 1857.

Mr. BOX: Then you and I very nearly agree upon the matter. (A laugh.)

The DEPUTY-GOVERNOR: I am very happy to hear it.

Mr. BOX: Can you tell us the amount of unaccounted-for gas?

The GOVERNOR: It is about 20 per cent.

Mr. R. A. GRAY: I think it is not judicious for gas companies to go into all these minute inquiries, which will come before the public.

Mr. BOX: I differ from you because it seriously affects our dividend.

The DEPUTY-GOVERNOR: It certainly has nothing to do with affecting your dividend for the last half year, for you have realized more for the quantity of gas made than you have done before.

Mr. BOX talked about proposing an amendment upon the motion for a dividend, and exhibited much surprise when informed that the motion had been already adopted.

Mr. CHOWNE said he thought it would be very much better if the court of directors would so regulate their accounts as to be able to equalize the rate of dividend, as the shares of the company would be then more saleable in the market. They might from their knowledge of the concern be able to calculate that, though they had a balance of £30,000 last year, that balance would not be nearly so large this year, and by retaining a little more in hand on the former occasion, they would have been in a position to give the same rate of dividend now that they did in November last.

The GOVERNOR said the directors were anxious that, if possible, the dividends should be uniform.

Mr. CHOWNE said he was not asking them to make a larger dividend this year, but merely expressing his opinion that it would have been better had they divided less last year and carried a larger sum over. The company's shares had been quoted at 69 and 70 in the market, and now they would not fetch more than 65, which indicated a feeling that there would be a depreciation in the amount of the dividend. Persons liked to invest their capital in undertakings where they could know almost for a certainty what dividends they would receive.

Mr. GRAY said it was morally impossible that an undertaking of this sort should have an uniform dividend. What they were now assembled for was to give the proprietors the dividend they were entitled to from the successful working of the company, and if they divided less than the amount which had been earned, they would do a palpable injustice.

The DEPUTY-GOVERNOR said the principle which the board had laid down was, he believed, a very proper one—viz., that each half year the proprietors who held stock at the time should divide the profits which had been earned. At Christmas, 1857, they divided 6 per cent.; at Midsummer last they were able to divide 8 per cent., and carry over a considerable sum; and he held that it would not have been fair, for the sake of equalizing the dividend, to have paid only 6 per cent. then, and carried over a much larger sum. Had they done so, the holders of stock at that time who were not holders now would have been entitled to complain that they had not received what was their fair proportion of the earnings of the company. He believed it was a fair and proper principle in trade, that every half year they should divide that which had been their actual earnings, after making suitable provision for carrying on the concern; and private individuals did the same thing, after making allowances for bad debts and other contingencies. With respect to the dividend now declared being only 7½ per cent. as against 8 per cent. last Midsummer, the proprietors would recollect that at Christmas, 1857, it was only 6 per cent., and therefore there was a positive increase upon the twelve-months of 1½ per cent. If they would look at the accounts, they would find that this arose from the fact that the profits at the former period were only £18,000, whereas now they were £21,000. It must be borne in mind, too, that the company had had large expenses this half year, and that the rental received during the half year ending at Midsummer was always larger than that received at Christmas. Nothing could be more satisfactory than the result of their coal account. In 1856, 1857, and 1858, the company had used 109,000 tons of coals as nearly as possible in each year, and yet their rental for this year was £10,000 more than it was during the first of those he had named.

Mr. CHOWNE said the directors had promised the proprietors that there would be such an improvement from the outlay they made.

The DEPUTY-GOVERNOR was aware of it, and referred to the circumstance to show how the statements of the directors had been verified. They got so much more gas by the improvements which had been effected in the retorts that he thought the result was satisfactory in every way. The printed accounts in the hands of the proprietors showed where the expenses had been heaviest, but he might also tell them candidly that the Curtain Road station was a small station, and the directors had had many difficulties in connexion with it. The Central Gas Company opposed them in that district, and the directors of this company at one time did not know exactly whether they should require to keep up that station or not, and consequently they let it get into a state of dilapidation, which, as a matter of prudence, they ought not to have allowed it to do. But now they found that the call for gas was so large that there was no chance of doing without it, and they had been effecting some improvements at the station. They had rebuilt the retort-beds, and replaced the iron with clay retorts, and though the expenses thus incurred were large, yet in one or two years they would be enabled to save the outlay, as the station was now in a most perfect state. As, however, this was a mere interchange of iron for clay, the directors had thought the whole of the cost ought to go to wear and tear. They had therefore charged every shilling so expended to that account—and thus, though the proprietors got a half per cent. less in their dividends, the company was placed in a safer and sounder position. It must be remembered also that they were now paying upon an additional capital of £41,000.

Mr. CHOWNE said he was aware of all these facts, and he only meant by the observations he had made that, if the dividend could be equalized, the price of the shares in the market would not vary so much.

The DEPUTY-GOVERNOR said that was not, he thought, what the company had to look to.

Mr. CHOWNE said he was not in the habit of buying and selling shares, and therefore it could not be supposed that he had any personal feeling in the matter. It would be found that he represented shares which were taken thirty years ago.

The DEPUTY-GOVERNOR said he had heard the remark made that they ought to look to the market value of their shares, but in his opinion what they had to do was to divide the profits as they made them.

Mr. POLLOCK remarked that companies which professed to pay permanent dividends divided their surplus profits in bonuses, and it was in reference to the bonus paid that the market value of the shares varied to some extent. He congratulated the proprietors that the shares of this company had not been affected by the late panic, and he believed it arose from the confidence which was generally entertained that no dividend would be paid but what had been fairly earned. He considered that they had a board of directors which was unequalled by any in London.

Mr. PERRY agreed with the last speaker, and thought the proprietors should have confidence in the board that they would do what was right.

The DEPUTY-GOVERNOR said the auditor who was present (Mr. Sloper) wished to make some proposition to the meeting.

Mr. GRAY inquired whether it was a matter in which the directors were concerned?

The DEPUTY-GOVERNOR said it was a matter which the board felt they had nothing to do with, and that it rested entirely between the auditors and the proprietors.

Mr. SLOPER said it was a delicate matter for him to touch upon, but some time previous to the death of his colleague, Mr. Witham, it had been a subject of conversation between them whether it was not desirable to raise the question of additional remuneration to those auditors who for three years and a half had done duty in the absence of Mr. Wollaston. At the time of his resignation Mr. Witham sent in a letter on the subject which he (Mr. Sloper) was under the impression had received the attention of the board; and since his colleague's death he had received an intimation that it was a matter which should be brought before the court of proprietors for them to deal with it as they saw fit. By the absence of Mr. Wollaston additional duties had been imposed upon the other auditors, while the company had benefited to the extent of about £200, which would have been paid to Mr. Wollaston had he been here to render his services in the audit of their accounts. On the principle that the labourer is worthy of his hire, he asked that his letter, and the letter of Mr. Witham might be read.

Mr. BARKER (a director) said he had seen Mr. Wollaston's brother a day or two since, who informed him that that gentleman was expected home daily.

Mr. GRAY thought the matter had better be deferred until their next meeting, by which time they would know whether Mr. Wollaston would resume his services as an auditor.

A long conversation ensued upon the subject, the general opinion being in favour of the view expressed by Mr. Gray.

A motion was proposed by Mr. FINCHAM, and seconded by Mr. PERRY, that an additional sum of £100 should be paid to the two acting auditors.

Mr. BESLEY urged that the motion should be withdrawn, and said that on the next occasion he should submit a resolution to reduce the number of auditors to two.

Mr. MAUGHAN inquired whether the contingent-fund, as it appeared in the accounts, £17,055, was really in existence, or whether that amount was merely the sums written off from profits which had gone into the works?

The GOVERNOR: It is money invested in the funds. We added £5000 to it the other day.

The DEPUTY-GOVERNOR: The contingent-fund is £17,055. 18s., as it appears in the accounts. When we wanted capital some years ago we borrowed that sum of the contingent-fund, and we have since repaid £15,000, which is invested in the funds. We still owe the difference to that fund. It is another instance of the prosperity of the company that we have been enabled to repay so much of that money. Last half year we had £10,730 of Consols upon which we received dividend, and next half year we shall receive it upon £15,865.

In answer to some inquiries respecting the mode of auditing the accounts,

Mr. BARKER said he was an auditor of the company some twenty-five or thirty years ago, and he used to certify the accounts as "Examined and found correct," as approving of the accuracy of the accounts of the company; but subsequently it was considered that in so certifying they were approving of the appropriation of the funds to wear and tear, rebuilding, &c., whereas the auditors had no control over these matters, which belonged exclusively to the board of directors. His successors, therefore, altered the certificate to its present form—"Examined and found to agree with the books of the company," which had been continued to the present time. The auditors did, however, examine all vouchers, as well as all books, both of receipt and expenditure of money.

Mr. GRAY said he thought it was a matter to be regretted that the auditors had departed from the old system. They were not called upon to express an opinion upon the conduct of the directors, but simply to certify that they had examined and found the accounts correct.

Mr. PERRY said he thought the auditors were responsible for the correctness of the accounts, and the proprietors relied upon them not only to certify that they were correct, but that the funds had not been unjustifiably expended. (No, no.)

The DEPUTY-GOVERNOR: I do not hesitate to say that, if an auditor came to me and said, "Why have you laid out so-and-so?" I should say, "What is that to you?"

Mr. POLLOCK said each of the auditors was a shareholder, and it was his place, if he considered any expenditure unnecessary, to come to the court of proprietors and state his opinion; but it would be a great piece of impertinence for the auditors to seek to act as a court of appeal from the board.

Mr. GRAY then moved, and Mr. POLLOCK seconded, that the further consideration of the remuneration to the auditors be deferred until the next half-yearly meeting, which, after some further conversation, was agreed to.

Mr. BESLEY moved a vote of thanks to the governor, deputy-governor, and board of directors.

Mr. GRAY seconded the motion. He was sure there could be but one opinion that the directors were entitled to the cordial thanks of the proprietors, for they had managed the affairs of the company in the most judicious manner, and he had no doubt that the present state of prosperity to which they had brought it would still continue. At the same time, while he was on his legs, he might say, in reference to a remark which had been made, that though he would not detract from the merits of this board of directors, he could not agree with the honourable proprietor who considered they were unequalled by any in London. He begged to say that he believed there were others quite as good.

The motion was very cordially adopted.

The GOVERNOR said: On behalf of myself and friends we return you our most hearty thanks for this mark of your approbation; and you may rest assured—and I speak firmly and boldly on the subject—that as long as we have life and health, we shall endeavour to improve the position of the company.—The proceedings then terminated.

## BALANCE-SHEET, DECEMBER 25, 1858.

| *Dr.* | | | *Cr.* | | |
|---|---|---|---|---|---|
| To 1st, 2nd, and 3rd capitals, after deducting the amount of 150 shares purchased | | £592,500 0 0 | By amount due to the company, viz.:— | | |
| Fourth capital | | 60,000 0 0 | For rent of light at the several stations, viz.:— | | |
| | | £652,500 0 0 | Westminster station | £43,783 11 9 | |
| Expended, viz.:— | | | Brick Lane ditto | 18,076 13 7 | |
| Westminster station— | | | Curtain Road ditto | 9,495 8 4 | |
| Balance at Midsummer | £368,192 10 0 | | | | £71,355 13 8 |
| Expended this half year, viz.:— | | | For coke and breeze sold at the stations, viz.:— | | |
| For balance of tank and gasholder in Holywell Street | £ 703 1 1 | | Westminster station | £ 837 4 1 | |
| For districting | 109 18 5 | | Brick Lane ditto | 1,746 2 6 | |
| For sulphate apparatus | 881 12 1 | | Curtain Road ditto | 333 17 1 | |
| For mains | 500 11 11 | | | | 2,917 3 8 |
| | 2,195 3 6 | | For tar and other products sold at the stations | | 172 7 3 |
| | £370,387 13 6 | | Balances of sundry accounts due to the company | | 1,369 18 5 |
| Brick Lane station— | | | Treasurer's accounts, viz.:— | | |
| Balance at Midsummer | £151,926 9 5 | | Balance of general account | £3,419 5 2 | |
| Expended this half year, viz.:— | | | Ditto dividend ditto | 1,243 0 6 | |
| For mains | £ 326 10 3 | | | | 4,662 5 8 |
| For one-fourth of cost of boiler-house and wall | 263 1 11 | | Bills on hand not paid | | 176 13 3 |
| | 589 12 2 | | Cash advanced to pay wages at the stations | | 930 0 0 |
| | 152,516 1 7 | | Stores on hand, viz.:— | | |
| Curtain Road station— | | | Westminster station | £3,619 15 10 | |
| Balance at Midsummer | £62,821 13 10 | | Brick Lane ditto | 2,428 18 6 | |
| Expended this half year, viz.:— | | | | | 6,048 14 4 |
| For purifiers | £ 326 4 5 | | Coals on hand, viz.:— | | |
| For half cost of exhauster and house | 284 7 1 | | Westminster station | £7,684 17 1 | |
| | 610 11 6 | | Brick Lane ditto | 5,061 2 5 | |
| | 63,432 5 4 | | Curtain Road ditto | 683 11 5 | |
| | 586,336 0 5 | | On shipboard | 1,473 4 4 | |
| | £66,163 19 7 | | | | 14,902 15 3 |
| Dividends remaining unpaid | 5,800 19 6 | | Coke and breeze on hand, viz.:— | | |
| Debts due by the company for coals, and to sundry tradesmen and others | 10,394 15 9 | | Westminster station | £ 158 5 10 | |
| Due to collectors for commission, viz.:— | | | Brick Lane ditto | 152 15 3 | |
| Westminster station | £ 326 7 8 | | Curtain Road ditto | 75 14 7 | |
| Brick Lane ditto | 111 13 5 | | | | 386 15 8 |
| Curtain Road ditto | 50 9 0 | | Tar and other products on hand | | 525 17 2 |
| | 488 10 1 | | Ship *Dispatch* | | 831 0 10 |
| Due for wages and contingencies, viz.— | | | £5188. 1s. 4d. Three per Cent. Consols on hand | | 5,000 0 0 |
| Westminster station | £ 620 10 8 | | New works, balance at Midsummer | £3,661 10 5 | |
| Brick Lane ditto | 394 16 8 | | Half cost of exhauster and house | 284 7 0 | |
| Curtain Road ditto | 134 10 0 | | | £3,945 17 5 | |
| | 1,149 17 4 | | Less amount charged to profit and loss | £1,617 16 0 / 71 1 9 | |
| Due at chief office for contingencies | 9 18 0 | | | 1,688 17 9 | |
| Balance of profit and loss, viz.:— | | | | | 2,256 19 8 |
| Balance to June 24, 1858 | £30,001 9 0 | | | | |
| Less half year's dividend on £652,500 | 26,100 0 0 | | | | |
| | £3,901 9 0 | | | | |
| Profit of the half year ending Christmas, 1858 | 21,570 17 7 | | | | |
| | 25,472 6 7 | | | | |
| Contingent-fund | £17,055 18 0 | | | | |
| Invested in the purchase of £15,865. 4s. 5d. Reduced Three per Cent. Annuities | 15,000 0 0 | | | | |
| | 2,055 18 0 | | | | |
| | £111,536 4 10 | | | | £111,536 4 10 |

## PROFIT AND LOSS, FROM JUNE 24 TO DECEMBER 25, 1858.

| *Dr.* | | | *Cr.* | | |
|---|---|---|---|---|---|
| To coals consumed in the half year, including labour | | £46,251 7 9 | By rental of light for the half year | | £93,244 4 6 |
| Stores, &c., used in the half year, viz.:— | | | Coke and breeze, deducting labour, viz.:— | | |
| Retorts and setting, including labour | | 3,250 18 5 | Coke | £16,596 5 2 | |
| Lamps and lamp lighting, ditto | | 1,931 5 11 | Breeze | 253 9 10 | |
| Carrying on the works | | 3,370 14 5 | | | 16,849 15 0 |
| General wear and tear and mains, including £1617. 16s., being 25 per cent. on the amount already charged to new works; also £71. 1s. 9d., being 25 per cent. on £284. 7s., half the cost of the new exhauster and house at Curtain Road station, charged to new works this half year; and £789. 5s. 9d., three-fourths of the cost of the new boiler-house and wall at Brick Lane station | £11,581 18 10 | | Tar and other products, deducting labour | | 1,354 2 3 |
| Less received for old and burnt stores | 913 5 3 | | Discounts and abatements allowed by tradesmen for cash payments | | 1,111 19 6 |
| | 10,668 13 7 | | Poplar station rent account, balance | | 12 4 10 |
| Meters and fixing, including labour | 2,301 11 4 | | Rents received | | 293 2 0 |
| Paving | 1,277 13 9 | | Dividend on the contingent-fund—viz., on £10,730. 8s. 8d. Reduced Three per Cent. Annuities | | 157 12 1 |
| Directors and auditors | £1,249 10 0 | | Interest | | 235 10 10 |
| Directors as per vote of court of proprietors | 500 0 0 | | | | |
| | 1,749 10 0 | | | | |
| Salaries and commissions | 5,001 17 0 | | | | |
| Wages and contingencies, viz.:— | | | | | |
| Wages | £9,457 7 0 | | | | |
| Contingencies | 1,448 10 11 | | | | |
| | 10,905 17 11 | | | | |
| Rent and taxes, viz.:— | | | | | |
| Rent | £ 376 15 7 | | | | |
| Taxes | 2,523 16 2 | | | | |
| | 2,900 11 9 | | | | |
| Income-tax | 376 18 8 | | | | |
| Law expenses | 569 15 0 | | | | |
| Annuity to Mr. J. Cowell, late accountant | 65 0 0 | | | | |
| Sick and benevolent fund | 130 0 0 | | | | |
| Debts due at the stations, being bad written off | £1,019 10 9 | | | | |
| Received on bad debts | 83 12 10 | | | | |
| | 935 17 11 | | | | |
| | £91,687 13 5 | | | | |
| Balance | 21,570 17 7 | | | | |
| | £113,258 11 0 | | | | £113,258 11 0 |

# PUBLIC LIGHTING IN THE METROPOLIS.

*(From Returns furnished to the Managers of the Metropolis Gas Inquiry, corrected by Returns from some of the Companies in respect of the Number of Lamps.)*

[In the following table "V" means vestry, "B" means district board, and "Co." means gas company.]

| Name of Parish or District. | Name of Company supplying Gas to the Public Lamps. | Number of Public Lamps supplied by each Co. | Price paid for each Public Lamp per Annum. | Who provides the Lamps and Fittings. | Who Lights, Extinguishes, and Repairs the Lamps. | Estimated Consumption of each Public Lamp per Annum. | Deduction for Expenses on each Public Lamp*. | Net Sum paid for the Gas supplied to each Public Lamp. | Net Sum paid for each 1000 Feet of Gas supplied to Public Lamps. | Price of Gas to Private Consumers. | Price which should be paid for each Public Lamp, if charged at the same rate as Private Consumers. | Undercharge upon each Public Lamp. | Undercharge per Annum on all the Public Lamps. | Total Undercharge per Annum in each Parish or District. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | s. d. | | | Feet. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | £ s. d. | £ s. d. |
| Bermondsey | Surrey Consumers' | 381 | 80 0 | V | Co. | 21,520 | 13 0 | 67 0 | 3 1·36 | 4 6 | 109 10 | 29 10 | 568 6 6 | |
| " | Phœnix | 60 | 80 0 | V | Co. | 21,520 | 13 0 | 67 0 | 3 1·36 | 4 6 | 109 10 | 29 10 | 89 10 0 | |
| " | Bermondsey | 152 | 80 0 | V | Co. | 21,520 | 13 0 | 67 0 | 3 1·36 | 4 6 | 109 10 | 29 10 | 226 14 8 | |
| | | | | | | | | | | | | | | 884 11 2 |
| Camberwell | South Metropolitan | 1139 | 87 6 | V | Co. | 21,520 | 13 0 | 74 6 | 3 5·54 | 4 6 | 109 10 | 22 4 | 1271 17 8 | |
| " | Phœnix | 50 | 97 6 | V | Co. | 21,520 | 13 0 | 84 6 | 3 11·11 | 4 6 | 109 10 | 11 4 | 28 6 8 | |
| " | " | 3 | 107 6 | V | Co. | 21,520 | 13 0 | 94 6 | 4 4·69 | 4 6 | 109 10*c* | 2 4 | 7 0 | |
| " | Crystal Palace | 6 | 105 0 | V | Co. | 21,520 | 13 0 | 92 0 | 4 3·30 | 5 6 | 131 4*c* | 26 4 | 7 18 0 | |
| | | | | | | | | | | | | | | 1308 9 4 |
| Chelsea | London | 687 | 90 0 | V | Co. | 21,520 | 13 0 | 77 | 3 6·90 | 4 6 | 109 10 | 19 10 | 681 5 6 | 681 5 6 |
| Fulham | Brentford | 137 | 100 0 | Co. | Co. | 21,520 | 16 0 | 84 0 | 3 10·84 | 5 0 | 123 7 | 23 7 | 161 10 11 | |
| " | " | 152 | 110 0 | Co. | Co. | 21,520 | 16 0 | 94 0 | 4 4·36 | 5 0 | 123 7 | 13 7 | 103 4 8 | |
| " | " | 76 | 120 0 | Co. | Co. | 21,520 | 16 0 | 104 0 | 4 10 92 | 5 0 | 123 7*c* | 3 7 | 13 12 4 | |
| " | " | 19 | 130 0 | Co. | Co. | 21,520 | 16 0 | 114 0 | 5 3·56 | 5 0 | 123 7*c* | .. | .. | |
| " | London | 17 | 100 0 | Co. | Co. | 21,520 | 16 0 | 84 0 | 3 10·84 | 4 6 | 112 10 | 12 10 | 10 18 2 | |
| " | " | 75 | 110 0 | Co. | Co. | 21,520 | 16 0 | 94 0 | 4 4·36 | 4 6 | 112 10*c* | 2 10 | 10 12 6 | |
| " | " | 42 | 120 0 | Co. | Co. | 21,520 | 16 0 | 104 0 | 4 10·92 | 5 0 | 123 7*c* | 3 7 | 7 10 6 | |
| " | " | 6 | 130 0 | Co. | Co. | 21,520 | 16 0 | 114 0 | 5 3·56 | 4 6 | 112 10*c* | .. | .. | |
| " | " | 15 | 135 0 | Co. | Co. | 21,520 | 16 0 | 119 0 | 5 6·35 | 4 6 | 112 10*c* | .. | .. | |
| | | | | | | | | | | | | | | 307 9 1 |
| Greenwich | Phœnix | 437 | 95 0 | B | Co. | 21,520 | 13 0 | 82 0 | 3 9·72 | 4 6 | 109 10 | 14 10 | 324 2 2 | |
| " | Surrey Consumers' | 336 | 95 0 | B | Co. | 21,520 | 13 0 | 82 0 | 3 9·72 | 4 6 | 109 10 | 14 10 | 249 4 0 | |
| " | " | 42 | 78 0 | B | Co. | 17,870 | 13 0 | 65 0 | 3 7·64 | 4 6 | 93 5 | 15 5 | 32 11 0 | |
| | | | | | | | | | | | | | | 605 17 2 |
| Hackney | Imperial | 1186 | 100 0 | B | Co. | 21,520 | 13 0 | 87 0 | 4 0·17 | 4 6 | 109 10 | 9 10 | 583 0 4 | 583 0 4 |
| Hamlet Mile-End Old Tn. | Commercial | 579 | 88 0 | V | Co. | 21,520 | 13 0 | 75 0 | 3 5·82 | 4 0 | 99 1 | 11 1 | 320 17 3 | 320 17 3 |
| Holborn | London | 331 | 95 0 | B | Co. | 21,520 | 13 0 | 82 0 | 3 9·72 | 4 6 | 109 10 | 14 10 | 245 9 10 | |
| " | " | 31 | 65 0 | B | Co. | 12,912 | 13 0 | 52 0 | 4 0·32 | 4 6 | 71 1 | 6 1 | 9 8 7 | |
| " | " | 15 | 100 0 | B | Co. | 21,520 | 13 0 | 87 0 | 4 0·17 | 4 6 | 109 10 | 9 10 | 7 7 6 | |
| " | " | 85 | 84 0 | B | Co. | 21,520 | 13 0 | 71 0 | 3 3·12 | 4 6 | 109 10 | 25 10 | 109 15 10 | |
| | | | | | | | | | | | | | | 372 1 9 |
| Islington | Imperial | 2082 | 92 6 | V | Co. | 21,520 | 10 0*a* | 82 6 | 3 10·00 | 4 6 | 106 10 | 14 4 | 1492 2 0 | 1492 2 0 |
| Kensington | " | 181 | 105 0 | V | Co. | 21,520 | 13 0 | 92 0 | 4 3·30 | 4 6 | 109 10 | 4 10 | 43 14 10 | |
| " | London | 86 | 105 0 | V | Co. | 21,520 | 13 0 | 92 0 | 4 3·30 | 4 6 | 109 10 | 4 10 | 20 15 8 | |
| " | " | 29 | 70 0 | V | Co. | 21,520 | 13 0 | 57 0 | 2 7·78 | 4 6 | 109 10 | 39 10 | 57 15 2 | |
| | | | | | | | | | | | | | | 142 5 8 |
| Lambeth | Phœnix | 1062 | 97 6 | V | Co. | 21,520 | 13 0 | 84 6 | 3 11·11 | 4 6 | 109 10 | 12 4 | 654 18 0 | |
| " | London | 573 | 95 0 | V | Co. | 21,520 | 13 0 | 82 0 | 3 9·72 | 4 6 | 109 10 | 14 10 | 424 19 6 | |
| " | South Metropolitan | 502 | 98 6 | V | Co. | 21,520 | 13 0 | 85 6 | 3 11·67 | 4 6 | 109 10 | 11 4 | 284 9 4 | |
| " | Crystal Palace District | 48 | 105 0 | V | Co. | 21,520 | 13 0 | 92 0 | 4 3·30 | 5 6 | 131 4 | 26 4 | 63 4 0 | |
| | | | | | | | | | | | | | | 1427 10 10 |
| Lewisham | Phœnix | 50 | 90 0 | B | Co. | 16,375 | 9 8 | 80 4 | 4 10·87 | 5 0 | 91 7 | 1 7 | 3 19 2 | |
| " | Crystal Palace | 164 | 82 0 | B | Co. | 16,375 | 13 0 | 69 0 | 4 2·56 | 5 6 | 103 0 | 21 0 | 172 4 0 | |
| | | | | | | | | | | | | | | 176 3 2 |
| Paddington | Imperial | 1159 | 84 0 | Co. | Co. | 21,520 | 16 0 | 68 0 | 3 1·91 | 4 6 | 112 10 | 28 10 | 1670 7 10 | 1670 7 10 |
| Plumstead | Woolwich Consumers' | 174 | 90 0 | B | B | 19,160 | .. | 90 0 | 4 8·36 | 4 6 | 86 3 | .. | .. | |
| " | Phœnix | 122 | 95 0 | B | Co. | 17,800 | 10 6 | 84 6 | 4 8·96 | 4 6 | 80 2 | .. | .. | |
| Poplar | Commercial | 393 | 83 9 | B | Co. | 21,520 | 13 0 | 70 9 | 3 3·45 | 4 0 | 99 1 | 15 4 | 301 6 0 | |
| " | " | 360 | 101 3 | B | Co. | 21,520 | 13 0 | 88 3 | 4 1·21 | 4 0 | 99 1 | .. | .. | |
| | | | | | | | | | | | | | | 301 6 0 |
| Rotherhithe | Surrey Consumers' | 331 | 95 0 | B | Co. | 21,520 | 13 0 | 82 0 | 3 9·72 | 4 6 | 109 10 | 14 10 | 245 9 10 | 245 9 10 |
| St. George, Hanover Sq. | Chartered | 1129 | 72 6 | V | Co. | 21,520 | 13 0 | 59 6 | 2 9·17 | 4 6 | 109 10 | 37 4 | 2107 9 4 | 2107 9 4 |
| St. George in-the-East | Ratcliff | 425 | 95 0 | V | Co. | 21,520 | 10 0*a* | 85 0 | 3 11·39 | 4 6 | 109 10 | 14 10 | 315 4 2 | 315 4 2 |
| St. George-the-Martyr, Southwark | London | 117 | 95 0 | V | Co. | 25,824 | 13 0 | 82 0 | 3 2·10 | 4 6 | 129 2 | 34 2 | 199 17 6 | |
| " " | Phœnix | 405 | 85 0 | V | Co. | 25,824 | 13 0 | 72 0 | 2 9·45 | 4 6 | 129 2 | 44 2 | 894 7 6 | |
| " " | South Metropolitan | 78 | 84 0 | V | Co. | 25,824 | 13 0 | 71 0 | 2 8·99 | 4 6 | 129 2 | 45 2 | 176 3 0 | |
| | | | | | | | | | | | | | | 1270 8 0 |
| St. Giles | London | 247 | 90 0 | B | Co. | 21,520 | 13 0 | 77 0 | 3 6·90 | 4 6 | 109 10 | 19 10 | 244 18 10 | |
| " | " | 35 | 60 0 | B | Co. | 12,912 | 13 0 | 47 0 | 3 7·68 | 4 6 | 71 1 | 11 1 | 19 7 11 | |
| " | Imperial | 494 | 100 0 | B | Co. | 21,520 | 13 0 | 87 0 | 4 0·17 | 4 6 | 109 10 | 9 10 | 242 17 8 | |
| " | " | 39 | 60 0 | B | Co. | 12,912 | 13 0 | 47 0 | 3 7·68 | 4 6 | 71 1 | 11 1 | 21 12 3 | |
| " | Chartered | 34 | 84 0 | B | Co. | 21,520 | 13 0 | 71 0 | 3 3·12 | 4 6 | 109 10 | 25 10 | 43 18 4 | |
| | | | | | | | | | | | | | | 572 15 0 |
| St. James and St. John, Clerkenwell | Imperial | 289 | 90 0 | V | Co. | 21,520 | 13 0 | 77 0 | 3 6·90 | 4 6 | 109 10 | 19 10 | 286 11 10 | |
| " " | Chartered | 270 | 77 6 | V | Co. | 21,520 | 13 0 | 64 6 | 2 11·96 | 4 6 | 109 10 | 32 4 | 436 10 0 | |
| " " | City of London | 42 | 84 0 | V | Co. | 21,520 | 13 0 | 71 0 | 3 3·12 | 4 0 | 99 1 | 15 1 | 31 13 6 | |
| | | | | | | | | | | | | | | 754 15 4 |
| St. James, Westminster | London | 109 | 61 6 | V | Co. | 21,520 | 13 0 | 48 6 | 2 3·04 | 4 6 | 109 10 | 48 4 | 263 8 4 | |
| " " | Chartered | 39 | 72 6 | V | Co. | 21,520 | 13 0 | 59 6 | 2 9·17 | 4 6 | 109 10 | 37 4 | 72 16 0 | |
| | | | | | | | | | | | | | | 336 4 4 |
| St. John, Hampstead | Imperial | 410 | 110 0 | V | Co. | 21,520 | 13 0 | 97 0 | 4 6·08 | 4 6 | 109 10 | .. | .. | |
| St. Martin-in-the-Fields | Equitable | 643 | 70 0 | V | Co. | 21,520 | 13 0 | 57 0 | 2 7·78 | 4 6 | 109 10 | 39 10 | 1280 12 10 | 1280 12 10 |
| St. Mary, Newington | Phœnix | 454 | 89 0 | V | Co. | 21,520 | 13 0 | 76 0 | 3 6·37 | 4 6 | 109 10 | 20 10 | 475 8 4 | |
| " " | South Metropolitan | 363 | 90 0 | V | Co. | 17,870 | 13 0 | 77 0 | 4 3·70 | 4 6 | 93 2 | 3 2 | 57 9 6 | |
| | | | | | | | | | | | | | | 532 17 10 |
| St. Marylebone | Imperial | 3199 | 67 5 | V | Co. | 17,216 | 13 0 | 54 5 | 3 1·92 | 4 6 | 90 5 | 23 0 | 3678 17 0 | |
| " | Chartered | 267 | 70 0 | V | Co. | 17,216 | 13 0 | 57 0 | 3 3·73 | 4 6 | 90 5 | 20 5 | 272 11 3 | |
| | | | | | | | | | | | | | | 3951 8 3 |
| St. Matthew, Bethnal Gn. | Imperial | 562 | 80 0 | V | Co. | 21,520 | 13 0 | 67 0 | 3 1·36 | 4 6 | 109 10 | 29 10 | 838 6 4 | 838 6 4 |
| St. Leonard, Shoreditch | Independent | 1141 | 80 0 | V*b* | Co. | 21,520 | 13 0 | 67 0 | 3 1·36 | 4 6 | 109 10 | 29 10 | 1701 19 10 | 1701 19 10 |
| St. Luke, Middlesex | " | 419 | 82 6 | V*b* | Co. | 21,520 | 13 0 | 69 6 | 3 2·75 | 4 6 | 100 10 | 27 4 | 572 12 8 | |
| " " | Chartered | 124 | 76 0 | V | Co. | 21,520 | 13 0 | 63 0 | 2 11·13 | 4 6 | 109 10 | 33 10 | 209 15 4 | |
| " " | " | 11 | 77 6 | V | Co. | 21,520 | 13 0 | 64 6 | 2 11·96 | 4 6 | 109 10 | 32 4 | 17 15 8 | |
| " " | " | 10 | 82 0 | V | Co. | 21,520 | 13 0 | 69 0 | 3 2·47 | 4 6 | 109 10 | 27 10 | 13 18 4 | |
| " " | " | 42 | 46 0 | V | Co. | 12,912 | 13 0 | 33 0 | 2 6·68 | 4 6 | 71 2 | 25 2 | 52 17 0 | |
| | | 24972 | | | | | | | | | | | | 886 18 8 |
| | | | | | | | | | | | | | | £25047 16 10 |

* The figures in this column are those stated in the return published by the managers, which are, however, considerably less than the cost, which varies from 14s. 6d. to 18s. 6d. per lamp, according to circumstances, for lighting, extinguishing, and repairing alone, exclusive of any allowance for interest upon the lamps and fittings where such are provided by the companies.

*a* Charge for lighting only; the repairs being at the expense of the vestries. *b* The cocks and burners are supplied by the company.

*c* Lamps from 80 to 150 yards apart for which mains have been expressly laid.

PUBLIC LIGHTING IN THE METROPOLIS (*continued*).

| Name of Parish or District. | Name of Company supplying Gas to the Public Lamps. | Number of Public Lamps supplied by each Co. | Price paid for each Public Lamp per Annum. | Who provides the Lamps and Fittings. | Who Lights, Extinguishes, and Repairs the Lamps. | Estimated Consumption of each Public Lamp per Annum. | Deduction for Expenses on each Public Lamp *. | Net Sum paid for the Gas supplied to each Public Lamp. | Net Sum paid for each 1000 Feet of Gas supplied to Public Lamps. | Price of Gas to Private Consumers. | Price which should be paid for each Public Lamp, if charged at the same rate as Private Consumers. | Undercharge upon each Public Lamp. | Undercharge per Annum on all the Public Lamps. | Total Undercharge per Annum in each Parish or District. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Brought forward | 24972 | s. d. | | | Feet. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | £ s. d. | £ s. d. 25047 16 10 |
| St. Olave, Southwark | Surrey Consumers' | 431 | 80 0 | B | Co. | 21,520 | 13 0 | 67 0 | 3 1·36 | 4 6 | 109 10 | 29 10 | 642 18 2 | 642 18 2 |
| St. Pancras | Imperial | 2530 | 96 0 | V | Co. | 21,520 | 13 0 | 83 0 | 3 10·28 | 4 6 | 109 10 | 13 10 | 1749 18 4 | 1749 18 4 |
| St. Saviour | Phœnix | 167 | 95 0 | B | Co. | 19,368 | 13 *b* | 82 0 | 4 2·80 | 4 6 | 100 1 | 5 1 | 42 8 11 | |
| ,, | ,, | 341 | 87 6 | B | Co. | 19,368 | 13 0 | 74 6 | 3 10·15 | 4 6 | 100 1 | 12 7 | 214 10 11 | 256 19 10 |
| Strand | London | 218 | 80 0 | B | Co. | 17,216 | 13 0 | 67 0 | 3 10·70 | 4 6 | 90 5 | 10 5 | 113 10 10 | |
| ,, | Chartered | 211 | 73 6 | B | Co. | 17,216 | 13 0 | 60 6 | 3 6·17 | 4 6 | 90 5 | 16 11 | 173 9 5 | |
| ,, | Equitable | 221 | 80 0 | B | Co. | 17,216 | 13 0 | 67 0 | 3 10·70 | 4 6 | 90 5 | 10 5 | 115 1 11 | 402 2 2 |
| Wandsworth | Wandsworth | 314 | 105 0 | B | Co. | 21,320 | 13 0 | 92 0 | 4 3·30 | 5 0 | 120 7 | 15 7 | 244 13 2 | |
| ,, | London | 71 | 100 0 | B | Co. | 21,320 | 13 0 | 87 0 | 4 0·17 | 5 0 | 120 7 | 20 7 | 73 1 5 | |
| ,, | ,, | 108 | 115 0 | B | Co. | 21,320 | 13 0 | 102 0 | 4 8·87 | 5 0 | 120 7 | 5 7 | 30 3 0 | |
| ,, | South Metropolitan | 160 | 100 0 | B | Co. | 21,320 | 13 0 | 87 0 | 4 0·17 | 5 0 | 120 7 | 20 7 | 164 13 4 | |
| ,, | ,, ,, | 7 | 115 0 | B | Co. | 21,320 | 13 0 | 102 0 | 4 8·87 | 5 0 | 120 7*e* | 5 7 | 1 19 1 | |
| ,, | Phœnix | 444 | 100 0 | B | Co. | 21,320 | 13 0 | 87 0 | 4 0·17 | 5 0 | 120 7 | 20 7 | 456 19 0 | |
| ,, | ,, | 46 | 105 0 | B | Co. | 21,520 | 13 0 | 92 0 | 4 3·30 | 5 0 | 120 7 | 15 7 | 35 16 10 | |
| ,, | ,, | 166 | 112 0 | B | Co. | 21,520 | 13 0 | 99 0 | 4 7·20 | 5 0 | 120 7 | 8 7 | 45 9 10 | |
| ,, | ,, | 31 | 122 0 | B | Co. | 21,520 | 13 0 | 109 0 | 5 0·78 | 5 0 | 120 7*e* | .. | .. | |
| ,, | Brentford | 36 | 105 0 | B | Co. | 21,520 | 13 0 | 92 0 | 4 3·30 | 6 0 | 142 2 | 37 2 | 66 18 0 | |
| ,, | Mitcham and other Cos., from whom no return has been received | 35 | 72 0 | B | Co. | 7,445 | 13 0 | 59 0 | 7 11·09 | 6 0 | 57 10 | .. | .. | |
| ,, | | 28 | 120 0 | B | Co. | 21,520 | 13 0 | 107 0 | 4 11·66 | 5 0 | 120 7 | 7 | 16 4 | |
| ,, | | 32 | 135 6 | B | Co. | 18,020 | 13 0 | 122 6 | 6 9·57 | 6 0 | 121 2 | .. | .. | 1120 10 0 |
| Westminster | Equitable | 75 | 82 6 | B | Co. | 21,520 | 13 0 | 69 6 | 3 2·75 | 4 6 | 109 10 | 27 4 | 102 10 0 | 102 10 0 |
| Whitechapel | Commercial | 519 | 88 0 | B | Co. | 21,520 | 13 0 | 75 0 | 3 5·82 | 4 0 | 99 1 | 11 1 | 287 12 3 | |
| ,, | City of London | 16 | 84 0 | B | Co. | 21,520 | 13 0 | 71 0 | 3 3·12 | 4 0 | 99 1 | 15 1 | 12 1 4 | |
| ,, | Ratcliff | 10 | 92 0 | B | Co. | 21,520 | 13 0 | 79 0 | 3 8·05 | 4 6 | 109 10 | 17 10 | 8 18 4 | |
| ,, | ,, | 45 | 95 0 | B | Co. | 21,520 | 13 0 | 82 0 | 3 9·72 | 4 6 | 109 10 | 14 10 | 33 7 6 | 341 19 5 |
| Woolwich | Woolwich Equitable | 120 | 80 0 | B | B | 21,520 | .. | 80 0 | 3 8·60 | 4 9 | 102 3 | 22 3 | 133 10 0 | |
| ,, | Woolwich Consumers' | 110 | 80 0 | B | B | 21,520 | .. | 80 0 | 3 8·60 | 4 9 | 102 3 | 22 3 | 122 7 6 | |
| ,, (North) | Victoria | 9 | 100 0 | B | Co. | 21,520 | 13 0 | 87 0 | 4 0·17 | 6 0 | 142 1 | 42 1 | 18 18 9 | 274 16 3 |
| City of London | Great Central | 1760 | 84 0 | B | Co. | 21,520 | 13 0 | 71 0 | 3 3·12 | 4 0 | 99 1 | 15 1 | 1327 6 8 | |
| ,, | Chartered | 1101 | 82 0 | B | Co. | 21,520 | 13 0 | 69 0 | 3 2·47 | 4 0 | 99 1 | 17 1 | 940 8 9 | |
| ,, (Liberties) | City of London | 39 | 84 0 | B | Co. | 21,520 | 13 0 | 71 0 | 3 3·12 | 4 0 | 99 1 | 15 1 | 29 8 3 | |
| ,, ,, | ,, ,, | 40 | 63 0 | B | Co. | 12,912 | 13 0 | 50 0 | 3 10·46 | 4 0 | 64 8 | 1 8 | 3 6 8 | 2300 10 4 |
| Lamps supplied with cannel coal gas in Westminster, Chelsea, Fulham, Kensington, St. George's Hanover Square, St. James's, and Hamptead | | 34353 3375 | | | | | | | | | | | Total amount of undercharge | 32,240 1 4 |
| Total number of public lamps within the limits of the Metropolis Local Management Act | | 37728 | | | | | | | | | | | | |

* The figures in this column are those stated in the return published by the managers, which are, however, considerably less than the cost, which varies from 14s. 6d. to 18s. 6d. per lamp, according to circumstances, for lighting, extinguishing, and repairing alone, exclusive of any allowance for interest upon the lamps and fittings where such are provided by the companies.

*a* Charge for lighting only; the repairs being at the expense of the vestries. *b* The cocks and burners are supplied by the company.

*c* Lamps from 80 to 150 yards apart for which mains have been expressly laid.

GAS LIGHTED BY ELECTRICITY.—Two "sunlights," each containing 75 burners, have just been placed immediately under the ceiling in the centre of the music-hall in the Edinburgh University, the ceiling being 40 feet in width and 50 feet from the floor. These burners have been successfully lit by an application of the electric current. The mode of operation may be thus explained:—The galvanic battery is placed in the cellar, and from it positive and negative wires are carried up the side of the hall and along the ceiling to immediately over the burners. Then it is coiled round the poles of an electro-magnet, to the keeper of which are attached a couple of wires bearing a platina wire. On the current of electricity being established at the battery, the platina wire, placed within an inch of the burner, becomes red-hot, and the gas being simultaneously turned on, the whole 75 lights, which are closely contiguous, immediately flash into flame. The electric current having thus answered its purpose, is at once intercepted at the battery below, and the electro-magnet, ceasing to be a magnet, its keeper, with the wires attached, falls three inches below the flame, so drawing down the platina wire, which, were it to remain in position, would be destroyed by constant exposure to the powerful flame of the gas.—*Manchester Guardian.*

# Price Current.

## CASTINGS, PER TON.

*Average Weight of Cast-Iron Gas-Pipes, per Yard.*

| 1¼ in. | 2 in. | 2½ in. | 3 in. | 4 in. | 5 in. | 6 in. | 7 in. | 8 in. | 9 in. | 10 in. | 12 in. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 21 | 28 | 33 | 51 | 70 | 89 | 107 | 126 | 149 | 177 | 208 lbs. |

| Retail Prices are 5 to 10 per cent. higher. | London. | Glasgow. | Newcastle. | Wales. | Yorkshire, Derbyshire, and Staffordsh. |
|---|---|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. | £ s. d. | £ s. d. |
| Pig Iron, No. 1 | 4 10 0 | 2 14 0 | 3 0 0 | 4 0 0 | 4 5 0 |
| 1¼ and 2 inches Socket-Pipes | 7 15 0 | 7 0 0 | 7 5 0 | 7 10 0 | 7 5 0 |
| 2½ and 3 ,, ,, | 7 5 0 | 6 15 0 | 7 0 0 | 7 5 0 | 7 0 0 |
| 4 and 5 ,, ,, | 7 5 0 | 6 10 0 | 6 15 0 | 7 0 0 | 6 15 0 |
| 6 in. and upwards ,, | 7 0 0 | 6 5 0 | 6 5 0 | 6 15 0 | 6 5 0 |
| Retorts, 1st fusion, hot blast | 6 15 0 | ... | 6 15 0 | 7 0 0 | 6 15 0 |
| ,, 2nd ,, cold ,, | 7 15 0 | ... | 7 0 0 | 7 5 0 | 7 0 0 |
| Tank Plates, ⅜ thick and above | 7 5 0 | 6 10 0 | 6 15 0 | 7 0 0 | 6 15 0 |

## WROUGHT-IRON TUBING,

*Subject to 40 per cent. Discount.*

| | 2 in. | 1½ in. | 1¼ in. | 1 in. | ¾ in. | ½ in. |
|---|---|---|---|---|---|---|
| | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. |
| Patent Welded Tubes, from 2 to 12 ft., perft. | 1 8 | 1 0 | 0 10 | 0 7 | 0 5 | 0 4½ |
| ,, ,, ,, 6 in. to 18 in., each | 3 0 | 2 0 | 1 9 | 1 3 | 1 0 | 0 9 |
| Connecting-Pieces, or Long Screws | 3 6 | 2 3 | 2 0 | 1 6 | 1 2 | 0 11 |
| Bends, Springs, and Elbows—wrought iron | 3 9 | 2 3 | 1 9 | 1 0 | 0 10 | 0 8 |
| Tees, wrought or cast | 4 0 | 2 6 | 2 0 | 1 6 | 1 1 | 0 10 |
| Crosses, wrought or cast | 4 6 | 3 0 | 2 6 | 2 0 | 1 6 | 1 2 |
| Iron Cocks | 17 6 | 9 6 | 7 6 | 4 6 | 3 3 | 2 6 |
| ,, with brass plug | 28 0 | 16 0 | 13 0 | 7 0 | 5 6 | 4 6 |
| Diminishing Sockets, Caps, Plugs, and Plain Sockets [Nipples | 1 3 | 0 9 | 0 8 | 0 6 | 0 5 | 0 4 |
| Syphons, 2 quart | 1 0 | 0 8 | 0 7 | 0 5 | 0 4 | 0 3 |
| | 15 0 | 14 0 | 13 6 | 13 0 | 12 0 | — |

## COALS, PER TON.

| *Newcastle.—Unscreened.* | | *Scotch Cannel.* | |
|---|---|---|---|
| Whitwell Primrose | 6s. 3d. | Boghead, at Leith | 40s. 0d. |
| Medomsley, Eighton Moor, and Burnhope | 6 6 | Kirkness, best | 23 0 |
| Pelaw | 6 9 | Capeldrae, 1st quality | 20 0 |
| New Pelton, Peareth, South Pelaw, Washington Hutton, and South Peareth | 7 0 | ,, 2nd ,, | 12 6 |
| Pelton | 7 9 | Lesmahago, at Glasgow | 25 0 |
| Ramsay's Newcastle Cannel | 16 0 | ,, ,, Leith | 27 6 |
| | | Arniston | 22 0 |
| | | Wemyss | 20 0 |
| | | Knightswood | 18 0 |
| | | Pirnie | 15 0 |

## SUNDRIES.

| | | | |
|---|---|---|---|
| Best Newcastle Fire-bricks | per 1000 | 60s. 0d. | |
| Cliff's Fire-bricks, at Wortley | per 1000 | 50 0 | |
| Ingham's Fire-bricks, at Wortley | ,, | 50 0 | |
| Fire-clay Retorts | per foot run, 5s. 6d. to | 7 0 | |
| Tough Cake Copper | per ton | £112 10s. | Foreign Spelter per ton £19 5 |
| English Pig Lead | ,, | 21 15 | English Block Tin ,, 126 0 |
| Welch Bar Iron, in London | ,, | 7 0 | Banca ,, 132 0 |
| Tarred Rope Yarn | per cwt. | 26s. 0d. | |

## FREIGHTS.

| *Coastwise—Newcastle.—Per Ton.* | | *Foreign.—Per Keel.* | |
|---|---|---|---|
| Chatham & Rochester | 7s. 0d. | Boulogne and Calais | £8 10 |
| Cork | — | Barcelona | £28 to 30 0 |
| Dover | 7 6 | Bordeaux | 15 0 |
| Dublin | — | Cadiz | 16 0 |
| Exeter Quay | 9 6 | Copenhagen | 11 0 |
| Folkestone | 7 6 | Dieppe | 8 15 |
| Hastings | 8 6 | Genoa | 25 0 |
| London (Pool) | 7 3 | Hamburg | 10 0 |
| Lowestoft & Yarmouth | 5s. to 5 3 | Havre | 12 0 |
| Lynn | 5 6 | Leghorn | 25 0 |
| Portsmouth | 8 9 | Lisbon | 17 0 |
| Plymouth | 9 3 | Rotterdam | 9 10 |
| Whitstable | 7 0 | Stettin | 14 10 |
| Weymouth | 9 0 | Trieste & Venice | £32 to 35 0 |

**WROUGHT-IRON Guides for Gas-holders.**—Designs and Working Drawings for Trussed Wrought-Iron Guides and Frames can be obtained of CHARLES DIXON, C. E., Chichester, SUSSEX.

**GEORGE ANDERSON,** Gas and CONSULTING ENGINEER, 104, LEADENHALL STREET, LONDON (E.C.).
**DIRECT-ACTING GAS-EXHAUSTERS,**
supplied either with or without Steam-Engines and Boilers.
**FOUR-WAY DIAPHRAGM VALVES,**
one of which answers the purpose of THREE ordinary Valves, as applied to Purifiers, or in shutting off and passing Station-Meters, Governors, or other apparatus, while the Connecting-Pipes are also much simplified.
**RETORT SETTINGS,**
designed to be heated by Tar alone, and with a total absence of Smoke.
Illustrated circulars, giving references and every information, may be obtained on application as above.

PATENT FLEXIBLE GAS TUBING,
VULCANIZED INDIARUBBER HOSE-PIPES, WASHERS, PACKING, &c.
**JAMES LYNE HANCOCK** begs to announce a considerable REDUCTION in PRICE of his PATENT VULCANIZED INDIARUBBER TUBING.
VULCANIZED INDIARUBBER AIR-TIGHT BAGS, any size, for Gas Mains, with flexible tubes attached, and fitted with stop-cocks complete.
Manufactory and Warehouse, No. 6, Goswell Road, LONDON (E.C.).

**WHITEHOUSE and CO.,** Boiler and **GASHOLDER MAKERS,**
GLOBE PATENT TUBE WORKS, WEDNESBURY,
Beg to draw the attention of Engineers and Managers of Gas Works to the superior quality of the Article they manufacture, both in respect of the iron employed, and the perfect manner in which it is welded; in proof of which they can refer to the testimonials of the most eminent Gas Engineers, and the experience of the principal of the large Gas Companies of the kingdom.
Orders promptly executed.

**ROBERT MACLAREN and CO.,**
EGLINTON FOUNDRY, GLASGOW,
Manufacturers of all sizes of Cast-Iron Main Pipes, by an improved Patent. General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

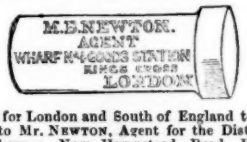
**M. SHEEN,** Gas and Railway Lantern Maker, 90½, Holborn Hill, begs to inform Managers of Gas-Works, &c., that she continues to contract and supply Lanterns on reasonable terms, and keep them in repair by the year.

**BENJAMIN GIBBONS, Jun.,**
DEEPDALE FIRE-CLAY & BRICK WORKS,
**Near DUDLEY,**
Manufacturer of every description of Fire-Bricks, Lumps, Quarries, Shields, Flue Covers, &c., to any size or shape required.
**FIRE-CLAY RETORTS,**
TO MODEL OR DRAWING.
B. G. begs to call the attention of Gas Companies to his Fire-Clay Retorts, which have been used with great satisfaction in some of the largest Gas-Works in the Metropolis and many Provincial Towns in England.
References given, if required.

THE PURIFYING-HOUSE SUPERSEDED.
**MR. LAMING** (Inventor of the Revivified Oxide of Iron Purification) has the satisfaction to announce that Gas may now be purified in a manner that combines unusual commercial advantages with all the possible requirements of the sanitary officer and the public. All that need be said to call attention to the new process is, that instead of the purifying-house, two vessels of small area, placed after the condenser, suffice; that these vessels never have the least communication with the atmosphere; and that neither lime, oxide, nor any other substance foreign to the gas itself is brought into contact with it. Gas engineers will perceive among the advantages thus offered, economy in room, labour, and materials; impossibility of nuisance; and total absence of injury to the illuminating power.
Particulars by addressing RICHARD LAMING, 118, FENCHURCH STREET.

*By Royal Letters Patent.*
**KAY'S Patent Equitable Gas-Meter** is the most effective preventive of fraud by "tilting," and is as simple in construction as the common meter.
Manufactured only by
**W. COWAN,**
60, BUCCLEUCH STREET, EDINBURGH;
AND
COMMERCIAL CHAMBERS, RIDINGS COURT, ST. MARY'S GATE, MANCHESTER.

**J. CLIFF'S** Fire Bricks, Clay RETORTS, &c.




Orders for London and South of England to be addressed to Mr. NEWTON, Agent for the District, 16, Castle Terrace, New Hampstead Road, KENTISH TOWN, N.W.
N.B.—A few Retorts of each size, and a large stock of Bricks and Lumps, always on hand at the above Wharf.

NOW READY,
**VOL. VII. of the JOURNAL of GAS** LIGHTING, WATER SUPPLY, and SANITARY IMPROVEMENT, for 1858, price 21s., bound in cloth and lettered. A few copies of Vols. II., III., IV., V. and VI. are still on sale.
W. B. KING, 11, Bolt Court, Fleet Street.

**THE GREAT CENTRAL GAS CONSUMERS' COMPANY.**
Just Published,
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**PADDON and FORD** respectfully invite the attention of Gas Companies and Managers to their PATENT STREET LAMP REGULATOR, which ensures any required consumption.
By its use a great saving is effected, and the item of "Unaccounted-for Gas" considerably decreased.

**PADDON and FORD,** Patent GAS-METER AND APPARATUS WORKS, GRAY'S-INN-ROAD, LONDON,
Manufacturers of WET and DRY GAS METERS, STATION METERS, GOVERNORS, EXPERIMENTAL APPARATUS, LANTERNS, &c. &c.
Contractors for the erection or alteration of Gas-Works; and every description of Apparatus required in Gas-Works supplied.

TO THE GAS COMPANIES OF GREAT BRITAIN AND THE CONTINENT.
**CANNEL AND COAL FOR GAS** PURPOSES.—Fifteen years' connexion with one of the largest Gas Concerns in England, enables us from practical experience to certify that the CANNEL and COAL we offer are those best suited for Gas purposes.
On application, we shall have much pleasure in forwarding our Tabulated Statements of Analyses, with Prices and Terms; also References as to respectability.
All Contract Orders have our careful and best attention.
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**JOHN ROGERSON and CO.,**
NEWCASTLE-ON-TYNE & MIDDLESBRO'-ON-TEES.
Wrought and Cast Iron Pipes, Cast-Iron Retorts, and all kinds of Foundry Work necessary for Gas-Works. Fire-Bricks and Clay Retorts. Gas Coals of every description. Pig, Bar, and Plate Iron.

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WILLINGTON QUAY,
NEAR NEWCASTLE-UPON-TYNE,
Manufacturer of Clay Retorts, Fire Bricks, and every description of Fire Clay Goods.

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is prepared to supply Gas and Water Companies with Apparatus and Appliances of every description, including Cast and Wrought Iron Goods, Coals, Fire-Bricks, Retorts, &c. &c.
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IRON TANKS for Gasholders, Railway Stations, &c.
GASHOLDERS.—Extensive premises at Gorton, solely for the manufacture of Gasholders, and other heavy Wrought-Iron Structures.
GAS APPARATUS.—W. M. has an extensive assortment of patterns for Purifiers from 4 feet to 15 feet square, also round ones from 4 feet to 10 feet diameter; Scrubbers, Condensers, Washers, Columns, Girders, and Tripod Patterns, suitable for Gasholders, from 10 feet to 150 feet diameter, either Single-lift or Telescope. Contractor for Gas Works of any Magnitude. Designs, Specifications, and Estimates furnished.
WROUGHT and CAST IRON ROOFS for Railway Stations, Gas Works, Warehouses, and Sheds, prepared for Slates or for Corrugated Iron.
IRON HOUSES, either for Dwellings, Manufactories, or Public Buildings.
PIPES and VALVES, for Gas and Water, from 2 inches to 48 inches bore.

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*** Country orders executed with care and despatch.

**THE COUNTY and GENERAL GAS** CONSUMERS' COMPANY (LIMITED).
Capital, £50,000 (with power to increase).
In 10,000 Shares of £5 each; Deposit, £1 per Share.
CHAIRMAN—E. H. J. CRAUFURD, Esq., M.P.
DEPUTY CHAIRMAN—ERASMUS WILSON, Esq., F.R.S.
Established for the purpose of lighting provincial districts of 2000 inhabitants and upwards.
The Company is in possession of several works, producing a valuable and increasing rental, and the Directors are prepared to purchase or erect works in localities where the consumers are willing to contribute a proportion of the necessary capital by subscribing for shares in the undertaking.
A Dividend at the rate of 5 per cent. per annum was declared at the last general meeting.
Prospectuses and all other information may be obtained at the Offices, 76, King William Street, LONDON, E.C.
R. S. PARKER, Secretary.

**WILLIAM PARKINSON AND CO.,**
(SUCCESSORS TO THE LATE SAMUEL CROSLEY,)
**COTTAGE LANE, CITY ROAD, LONDON,**
Beg to announce that, in addition to the Manufacture of
**GAS-METERS,**
they continue the Manufacture of
METERS FOR MEASURING WATER, SPIRITS, &c.,
commenced, under Patent in 1849, by the late Mr. William Parkinson.
These Meters are as simple and durable as the Gas-Meter, and as correct as that instrument in the registration of the fluids passing through them.

# ESSON'S PATENT
# COMPENSATING GAS-METER

**Affords *absolute security*** both to Gas Companies and Consumers, by maintaining a *constantly accurate Water-Level under all circumstances*, by means so simple and effective as to baffle and remove those objections which have been successfully urged against other complicated contrivances professing the same object.

MANUFACTURED ONLY BY

## WILLIAM COWAN,

**Buccleuch Street Works, EDINBURGH;**

AND

**Commercial Chambers, Ridings Court, St. Mary's Gate, MANCHESTER.**

ESTABLISHED 1827.

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*By Her Majesty's Royal Letters Patent.*

## JAMES MEACOCK,

## PATENT DRY and IMPROVED WET GAS-METER WORKS,

7, SNOW HILL, AND 16, WEST STREET, LONDON.

**ESTABLISHED 1836.**

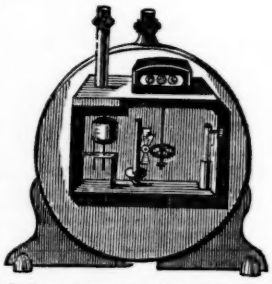
J. MEACOCK begs to call attention to his patent method of securing the Leather diaphragm of his Dry Meter. Instead of using the soldering iron for this purpose, it is held between two flat Metal Rings, and screwed up sound to a metal frame, as shown in the drawing.

By this improvement the perishing effect of hot tools to leather being avoided, its durability must be longer; also, its repair when needful is most simple, as a new leather diaphragm can be applied by merely unscrewing the old one from the rim or frame to which it had been screwed up.

Meters of Gas Companies being subject to so much wear and tear, J. M. begs leave to assure those who may honour him with their commands, that nothing but the stoutest materials for cases, the hardest gas-resisting metals, and best foreign leather for the interiors, will be used, and none but first-class workmen employed in their construction.

Wet Gas-Meters Repaired and Reconstructed with J. Meacock's Modern Improvements.

**METERS SENT ON APPROVAL.**



**In consequence of the great demand for the above Meters, J. Meacock has found it necessary to remove his Manufactory to more extensive Premises, 16, West Street, Smithfield, where Orders will be executed on the shortest notice.**

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# EDWARD COCKEY & SONS'

## PATENT GAS VALVES.

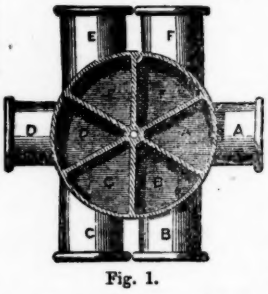


Fig. 1.

THESE Valves are formed of two cast-iron cylinders, with segmental divisions, having faces ground gas-tight, the upper cylinder turning horizontally on the lower one.

The lower cylinder has pipes from each division communicating with the vessels to and from which gas is to be passed. The upper cylinder has corresponding divisions, so arranged as to direct the passage of gas to the different segmental divisions in the lower part, and when it is turned on the face of the lower one to alter the flow of gas from one vessel to another.

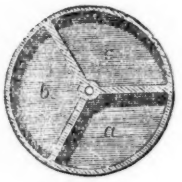


Fig. 2.

Fig. 1 shows the Valve prepared for two purifiers, in which, by turning the upper cylinder, Fig. 2, the Gas is directed to either purifier separately.

Another arrangement is just completed for two purifiers, by which the Gas may be directed through both purifiers together, entering either first, or through either purifier separately. The advantages of this arrangement will be too manifest to Gas Manufacturers to need comment.

The Valves are manufactured by the Patentees at their

**IRON WORKS, FROME SELWOOD.**

The following Testimonial has been received from an eminent Engineer:—

*Gaslight and Coke Company's Office, Cheltenham, Jan.* 17, 1859.

Messrs. Cockey and Sons, Frome.

Gentlemen,—The Patent Purifier Centre Valve which I had fixed instead of the common hydraulic valve for one of our sets of purifiers with 9-inch connexions, I am happy to say continues to afford satisfaction both to myself and to the workmen who have the charge of it.

I am, Gentlemen, yours truly, W. ESSON.

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ALSO MANUFACTURE

PURIFIERS, SCRUBBERS, CONDENSERS, AND OTHER IMPROVED GAS APPARATUS,

HAVING PATTERNS SUITABLE FOR GAS-WORKS OF DIFFERENT SIZES.

# FIRE-CLAY GAS RETORTS.

ESTABLISHED IN 1795.

## JOSEPH CLIFF,

**WORTLEY FIRE-BRICK WORKS, near LEEDS.**

THESE RETORTS are unrivalled in excellence, being the BEST FINISHED INTERNALLY, and THE MOST CORRECT IN FORM, of any in the Kingdom. From the peculiar composition used in working up the face of the material, they are rendered unusually smooth, close, and FREE FROM SURFACE CRACKS, thus, in a great measure, preventing leakage and the adhesion of carbon to their interior surface.

To meet the yearly increasing demand of UPWARDS OF THIRTY SEASONS and to carry out the late improvements in the manufacture, the Premises have been re-erected and much enlarged, and Engineers may rely WITH CONFIDENCE on their orders being completed with a greater regard to despatch than by any other House.

THE WORKS ARE WELL SITUATED

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FIRE-BRICKS, LUMPS, GUARDS, TILES, AND CLAY OF THE SAME QUALITY.

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Manufactory for every description of Casting and Machinery for Gas Works and Water Works.

Warehouse in London for Cast-iron Pipes and Connections of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

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PROPRIETORS OF
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MANUFACTURERS OF
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STOURBRIDGE.
*Late in the occupation of I. and W. King.*
*Originally J. Pidcock, Esq.*

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No. 8, WENLOCK-ROAD, CITY-ROAD, LONDON.

Contracts for Tanks, Gasholders, Roofs, Purifiers, and all descriptions of Gas Apparatus executed on the most reasonable terms. Improved Slide Valves, Steam, and Range Boilers, and Smiths' Work, of the best materials and workmanship.

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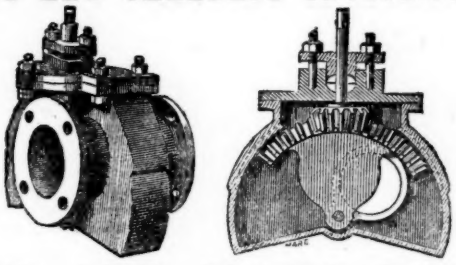
BEST AND CHEAPEST SLUICE-COCK.



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Above 3-inch diameter, price 10s. per inch. Brass face, 6d. per inch extra.

**Can be taken to pieces without being removed from the line of Piping.**

**NORTH WILTS FOUNDRY, DEVIZES.**

Wholesale Agents, Messrs. S. and E. RANSOME, 31, Essex Street, Strand, E.C., Where a Sample may be seen.

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**"ALL DOUBTS REMOVED."**

**DEFRIES' celebrated Dry Gas-METERS**, of which there are 80,000 in use in Palaces, Churches, Chapels, Royal Dock-yards, Club Houses, Public Offices, and other buildings throughout the Empire, the Continent, and Colonies.

His meter for 1500 lights, in use upwards of ten years at the Royal Italian Opera, until that building was destroyed by fire, was long afterwards dug out of the burnt ruins, then tested by the Chartered Gas Company and found inflexibly correct.

On the 9th of June, 1858, at the Western Gas Company, his meter for 150 lights, after considerable use, was doubted, and subjected to the most variable tests, from the full lighting down to a single jet, and in each case, as in numerous other instances, accuracy was finely indicated.

His two large meters at the Thames Tunnel have been in constant use day and night for upwards of twelve years (one continuation of dark hours), subjected to the wear and tear of 75 years, as compared with the ordinary hours of using gaslight above ground.

Gas Companies honouring Mr. Defries with their commands for his PATENT DRY METER, which has done so much service in simplifying the fitting up of gas, as well as checking surreptitious burning, will be guaranteed perfection for five years free of charge.

Defries' Prize-Medal Gas Baths, Gas-Cooking and Heating Stoves. The Polytechnic Gas Fire, with indestructible fuel, in daily operation (Saturday excepted) at the Office, 406, Euston Road, Fitzroy Square, LONDON.

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## LIVESEY FIRE-CLAY WORKS,

NEAR BLACKBURN, LANCASHIRE.

## ORLANDO BROTHERS,

MANUFACTURER OF PATENT CLAY RETORTS,

AND EVERY DESCRIPTION OF

**TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS ETC.**

FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

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## WILLIAM INGHAM AND SONS,

WORTLEY FIRE-BRICK AND RETORT WORKS,

Near

Leeds.

W. INGHAM and SONS, having for many years been extensively engaged in the Manufacture of

**RETORTS AND FIRE-BRICKS FROM THE CELEBRATED WORTLEY FIRE-CLAY,**

beg to call especial attention to their RETORTS, which have for many seasons proved to be unsurpassed in quality by any in the Kingdom, their FREEDOM FROM CRACKS and the ADHESION OF CARBON rendering them worthy the attention of all parties interested in the making of Gas.

The Works are of such magnitude as to ensure the prompt execution of orders to any extent.

**Estimates for Setting, or Bricklayers sent when required.**

**GAS OVENS IN SEGMENTS OF EQUAL QUALITY.**

**London Agents: CHADWICK and AKEROYD, Willington Stone Wharf, Regent's Park Basin.**

**A large stock of Fire-Bricks, Fire-Clay, Terra Cotta, and Drain-Pipes of all sizes kept in London at CHRISTIE & CO.—Wharf, 64, Bankside, Southwark, where all particulars of Prices, &c., may be obtained.**

N.B.—*Export orders continue to have prompt attention.*

# ALEXANDER WRIGHT,

GAS ENGINEER, MANUFACTURER OF GAS-METERS, GOVERNORS, AND EVERY DESCRIPTION OF GAS APPARATUS,
**55, MILLBANK STREET, WESTMINSTER.**
CONSUMERS' METERS at the List Price, with a Liberal Discount to Wholesale Purchasers.
THOMPSON'S BROMINE TEST, £1. 1s.—BROMINE, 3s. per Ounce.
BISULPHURET OF CARBON TEST, £2. 2s.
APPARATUS FOR DETERMINING THE HEATING POWER OF SAMPLES OF COAL AND OTHER DESCRIPTIONS OF FUEL, £5. 5s.,
INVENTED BY LEWIS THOMPSON, ESQ., M.R.C.S.
REGISTERING PRESSURE GAUGE, Net Price, £8. Glass Shade, 10s. extra.
STATION METERS, PRESSURE GAUGES, PHOTOMETERS, SPECIFIC GRAVITY APPARATUS, &c.

**JAMES OAKES and CO.,**
ALFRETON IRON WORKS, DERBYSHIRE,
AND
WENLOCK IRON WHARF, 20. WHARF ROAD, CITY ROAD, LONDON,
Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including best cold-blast Iron Retorts, Socket and Flange Pipes of all sizes, Bends, Branches, Syphons, Lamp Columns of various patterns, &c.
N.B.—Orders for Cast-iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention.
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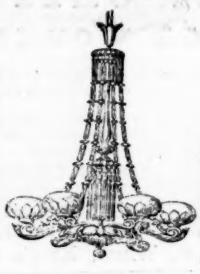

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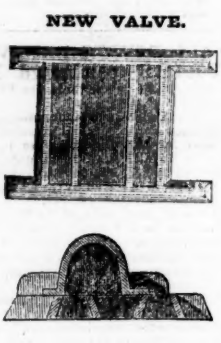
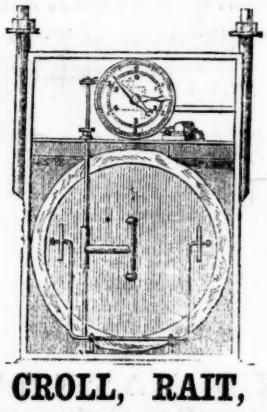
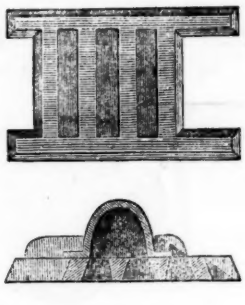




OLD VALVE.



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